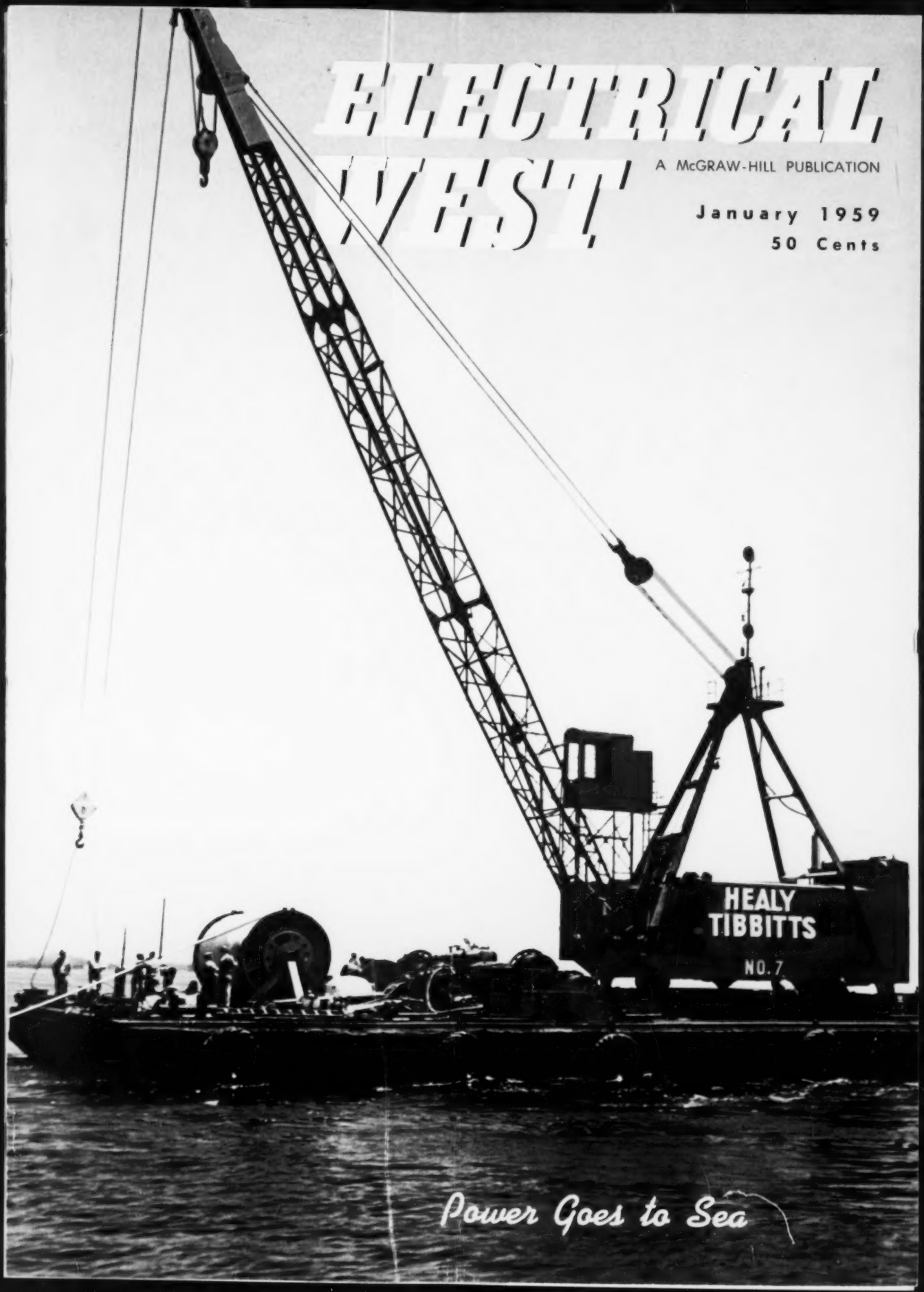
ELECTRICAL WEST

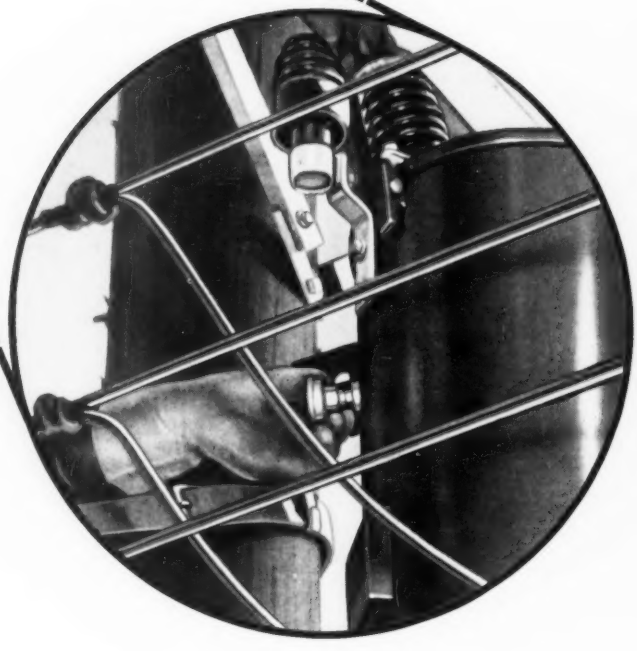
A McGRAW-HILL PUBLICATION

January 1959
50 Cents



Power Goes to Sea

this man is changing taps *faster . . . safer . . . more economically!*



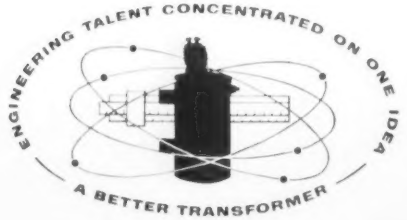
Take a good look at this lineman. He's changing taps alright, but his hand's *not* inside the tank, exposing the oil to contamination. And if you look closely, you'll note the absence of a hand-hole cover, thus decreasing the danger of tank breathing.

Take a good look. Note how low on the pole he is, well out of danger, and the taps will be changed in no time at all. All he has to do is remove and reverse the cap, then use it as a handle to make the setting. This saves time, which saves his employer money.

Finally, since his hand's not down inside the tank, this lineman can see what he's doing, so there'll never be any question in his mind about the tap setting!

This man is changing taps the thoroughly tested and proven RT & E way, with the industry-famous RT & E Externally Operated Tap Changer. Costly, time-wasting, and dangerous steps in changing taps have been completely eliminated.

Ask your RT & E representative to demonstrate this Tap Changer. Or write for further specifications.



RT&E CORPORATION

WAUKESHA, WISCONSIN • PORTLAND, OREGON

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U.S. Established 1887

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The Cover—First of a series of natural color views depicting the dramatic electrical growth of the West. "Power Goes to Sea" is a picture of the cable-laying operation bringing Southern California Edison power from the California Coast to off-shore oil-drilling rigs of Standard of California. See page 48.

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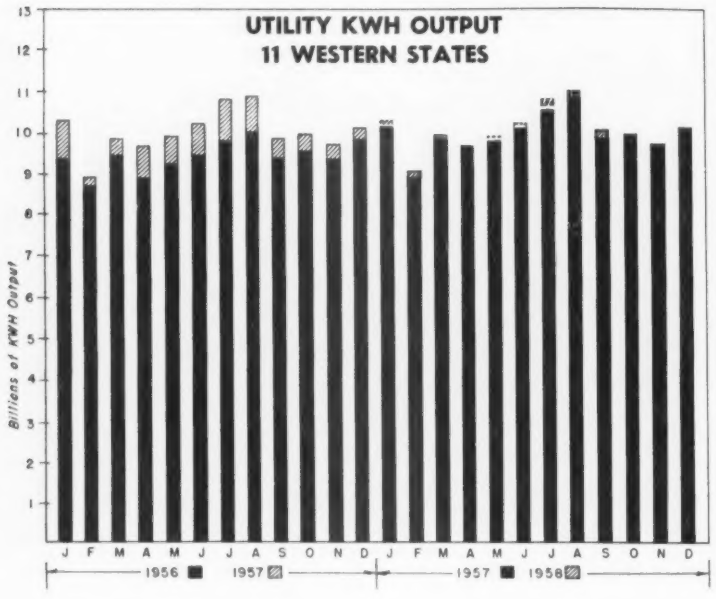
----How're We Doing?



Output Comparisons

Year-to-year Kwh Output Changes in Western Regions and U. S.
Per Cent Changes Over Same Week One Year Ago

Week Ending	Rocky Mountain	Pacific Southwest	Pacific Northwest	U. S. Total
Nov. 1	+9.9	+5.9	+3.6	+4.0
Nov. 8	+5.9	+5.5	−0.2	+3.3
Nov. 15	+8.1	+6.1	+1.2	+3.6
Nov. 22	+7.0	+8.5	+4.1	+3.7

Forecast Is Optimistic

Business pickup for 1959 is predicted generally and the fourth quarter of 1958 may well turn out to be the best in several years. Sound business conditions were reported continuing in southern Idaho and eastern Oregon, where eight-month cash returns from crops and livestock showed substantial gains. The San Diego area apparently had never felt a '58 recession. And Medallion homes were springing up all over the West with a large concentration in southern California tracts.

Northwest Picture

Domestic power use in the Pacific Northwest is expected to increase from the present average customer use of 8,500 kw to 14,000 kw in 1968, according to Bonneville Power Administration's forecast. Domestic and commercial energy requirements of the region will double during the decade and farm and residential loads are expected to increase from 11 billion kwh in 1957 to 23 billion in 1968, while commercial loads probably will increase from 4 billion to 9 billion kwh. Requirements of large industry are expected to increase about 5% annually to 36 billion kwh in 1968. Prediction is that much of the future industrial growth will be oriented to regional and western markets and to local resources such as pulp and paper.

Construction Highlights

Planned community development, including residences, schools, shopping center and industrial park, near Sacramento, Calif., $100,000,000.

Hall of Records, Los Angeles, Calif., $10,000,000.

Residential development, 1,600 to 1,800 homes, Westminster, Colo., $20,000,000.

Courthouse and office building, Denver, Colo., $15,000,000.

Office building, Anchorage, Alaska, $5,000,000.

ICBM Detection Center, Clear, Alaska, $30,000,000.

Housing project and shopping center, Denver, Colo., $35,000,000.

Department store, Lakewood, Colo., $5,000,000.

Seminary, Galt, Calif., $2,500,000.

Hospital additions and new construction: Denver, Colo., $1,000,000; Murray, Utah, $1,500,000; San Pedro, Calif., $1,900,000; Sedro Woolley, Wash., $1,800,000; Los Angeles, Calif., $2,400,000; Grossmont, Calif., $1,800,000; Mountain View, Calif., $7,300,000; Colorado Springs, Colo., $9,000,000; San Diego, Calif., $12,000,000.

Institution, Ventura, Calif., $6,000,000.

Motel, Oakland, Calif., $1,500,000; hotel, Seattle, Wash., $3,000,000.

Shopping center, Denver, Colo., $1,000,000; at Brighton, Colo., $1,000,000.

Apartment building, four-story, Portland, Ore., $1,500,000.

Medium security prison, Los Padres, Calif., $10,000,000.

Science building, Eastern Washington College, Medical Lake, Wash., $2,000,000.

New buildings and additions, Washington State College, Pullman, Wash., $6,500,000.

Twelve buildings, College of Great Falls, Mont., $3,000,000.

Student union building, University of California, Los Angeles, Calif., $5,500,000; Franz Hall addition, $1,000,000.

Packing plant, Greeley, Colo., $1,000,000.

New buildings and additions at California State Colleges: San Jose, $11,750,000; Long Beach, $5,200,000.

Homes, 100, Bellevue, Wash., $1,000,000.

YMCA addition, Denver, Colo., $1,200,000.

REACH WORK IN ANY DIRECTION

POWERS-AMERICAN

"Sky-Master"®

HYDRAULIC AERIAL BEAM

Outer beam can be spotted anywhere in a 270° arc . . . inner beam anywhere in a 115° arc. Mast can be rotated continuously in either direction.

Sky-Master gets to out-of-the-way places that can't be reached with conventional aerial equipment . . . saves time . . . saves manpower . . . often eliminates the need for rigging required on many overhead jobs.

With Sky-Master, it's unnecessary to "ground" an experienced man just because his climbing days are over. He can step into Sky-Master's insulated work basket, move the controls, and reach overhead work faster and safer than ever. When controls are released, Sky-Master stops right there—stays right there—until it's purposely moved. Can't creep even if hydraulic lines are damaged.

Sky-Master versatility is yours in one- and two-man models . . . in sizes for reaching from 42′ to 48′ above ground.

Why not send for descriptive literature and prices on both models—today!

McCABE-POWERS BODY COMPANY

625 CEDAR STREET
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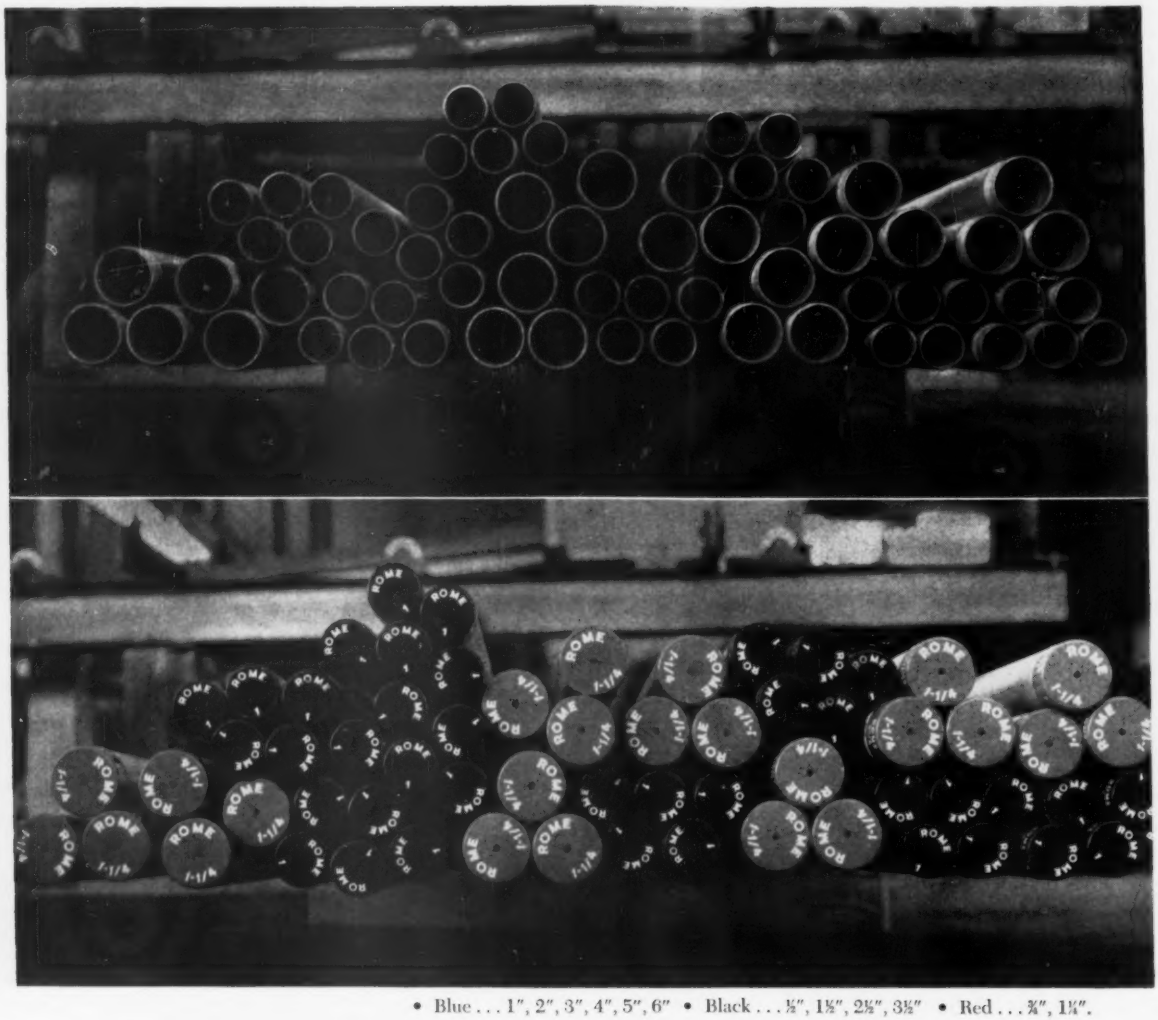
Another reason why
UTILITIES EXPECT MORE FROM

POWERS American

UTILITY BODIES AND EQUIPMENT



• Blue . . . 1", 2", 3", 4", 5", 6" • Black . . . ½", 1½", 2½", 3½" • Red . . . ¾", 1¼".

Which conduit stack would you prefer for easy size identification?

There's no need for your crews to spend a lot of time searching through stacks of rigid conduit for a particular size. Now they can see the size they need *from thirty feet away.*

With Rome's rigid conduit you can cut on-job costs by eliminating waste motion. This conduit is equipped with unique steel thread protectors that are color-coded and lithographed with the conduit size for easy and immediate identification.

Rome's rigid conduit with color-coded, size-imprinted thread protectors also saves you money by:

Eliminating capping time

Your crews need not search for seals or bushings to protect your conduit from concrete, dirt or stones. You simply bend a stub-up with Rome's color-coded thread protector in place and then leave it.

Positive thread protection

Rome's color-coded thread protectors are made of *steel* to prevent damage to the threads. They fit firmly on the conduit, yet are easily removed without damaging either the threads or the protector itself. You can use them over and over again.

Make your work easier—and save money, too. Use Rome's rigid conduit for your next job. Call your Rome Cable distributor for more information—or write to Department 948, Rome Cable Corporation, Torrance, Calif.

ROME CABLE
CORPORATION

Your jobs will shape up faster with Rome's easy-bending rigid conduit

A lot of time can be lost trying to form rigid conduit that's hard to bend. Now *you* can cut down on bending time—and get more *accurate* bends—with Rome's easy-bending rigid conduit.

Easy to bend, consistently uniform
Each length of conduit is uniformly annealed in a controlled-temperature furnace. By annealing, Rome can assure you of just the right degree of hardness and ductility for easy bending. Rome's rigid conduit is the *only* conduit that is control-annealed specifically for conduit use.

No chipping or flaking
To give you conduit with galvanizing that won't chip or flake on bending, every piece of conduit is flame washed, inside and outside, to remove all foreign matter before hot-dip galvanizing. Because an annealing process follows the flame washing, Rome's rigid conduit enters the zinc bath at the same temperature as the zinc . . . the result is a controlled alloying action that provides a tightly bonded heavy ductile zinc coating.

Quick, easy identification
You can pick out the Rome rigid conduit you need at a glance because the steel thread protectors are color-coded. In addition to the color coding, the ½" to 2" size protectors have the conduit size printed right on the face. These thread protectors may also be used to cover stub-ups, providing adequate protection to the threads.

Use Rome's easy-bending rigid conduit on your next job. Contact your nearest Rome representative for more information—or write to Department 949, Rome Cable Corporation, Torrance, California.

ROME CABLE
CORPORATION

NO TROUBLE CALLS WITH PUSHMATIC . . .

bolted connections are standard on every breaker

Ever hear of "nuisance tripping" in circuit breakers? It occurs regularly in many plants — boosting maintenance, hampering production, costing plenty. But not when Pushmatic® is on the scene. Here is a circuit breaker that thinks for itself — that puts an end to trouble calls. And here's why . . .

Unlike plug-in type breakers, a Pushmatic *bolts* to a bus bar, cannot work loose and cause excessive heating. It provides a high-pressure, low-resistant, *positive* connection always.

No complicated installation either. It can be installed simply and quickly by merely tightening a captive screw onto the bus bar.

Other Pushmatic plusses: Pushbutton convenience and control . . . quality you can depend on. More than a dozen individual tests are given each and every Pushmatic before packaging. The result is *proved* performance *every* time. Get Pushmatic and end trouble calls.

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BULLDOG

BullDog Electric Products Company, Division of I-T-E Circuit Breaker Company, Detroit 32, Mich. *BullDog Export Division:* 13 East 40th St., New York 16, N.Y. *In Canada:* BullDog Electric Products Co. (Canada) Ltd., 80 Clayson Rd., Toronto 15, Ont.

Consult the following Pacific Coast representatives:

Coast Electric & Manufacturing Co.
1733 N. E. Seventh Ave., P. O. Box 7712
Portland 12, Oregon

Young Electric & Mfg. Co.
2134 Curtis St.
Denver 2, Colorado

Safety Switchboard Company
910-89th Avenue
Oakland 21, California

BullDog Elec. Prod. Co. of Los Angeles
2885 E. Washington Blvd.
Los Angeles 23, California

EW news roundup

SALARY SURVEY—The EJC report on the professional income of engineers for 1958 will be available for mailing this year end.

The material will be considerably expanded over the 1956 survey, and will be broken down into some 20 industrial activities, various levels of government and engineering education. Advance orders for prompt mailing after publication are now being accepted by Engineers Joint Council, 29 W. 39th St., New York 18, N. Y., price $3.

Another forthcoming EJC study covers the demand for engineers. The report will appraise current industrial and governmental needs for engineers, and will contain data on engineering employment from organizations employing more than 200,000 engineers.

—EW—

BREAK-THROUGH — The first all-aluminum transmission towers in the United States will be constructed by the Public Service Electric & Gas Co. of Newark, N. J., in cooperation with the Aluminum Co. of America.

The utility plans to use 60 such towers on a double-circuit, 230-kv line from Hillsboro to North Branch, N. J. Spokesmen for Public Service say that the decision to use aluminum was a matter of economics and that the elimination of maintenance painting was the deciding factor. Towers will be of the standard appearance.

—EW—

HELP, HELP—The Electrical Historical Foundation asks for a record of all outdated electrical equipment to complete its tabulation of historical developments in the electrical field. Any information as to the location and details of old and obsolete equipment may be addressed to the foundation, Box 93, Newfane, Vt.

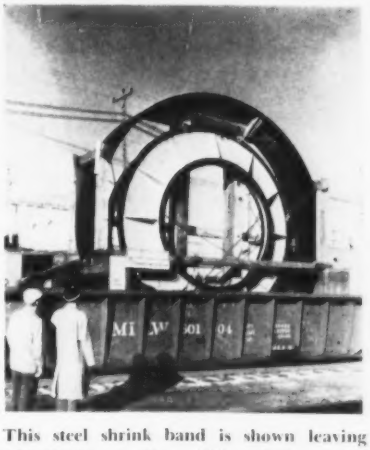
—EW—

DIAPER SERVICE—As the age of atomic power nears, chemical engineers are talking about the economics of a new service which would supply enriched uranium and other fuels to atomic energy plants and remove the irradiated or spent fuels under a service contract. Maybe a whole new industry will grow up around this highly specialized and technical problem.

—EW—

WHAT PRICE SURVIVAL? — Researchers of the Rand Corp., as reported by *Fortune* magazine, suggests that substantial protection against thermal-nuclear attack could be bought for half a billion dollars and save possibly 10,000,000 to 50,000,000 lives. This could mean the difference between survival and extinction for the United States.

Looking at it coldbloodedly, if a nuclear attack should occur and the U. S. lose 50% of its people, it would set the nation back only to its 1910 population figure.



This steel shrink band is shown leaving Allis-Chalmers' West Allis Works on its way across the country to the Noxon Rapids hydroelectric plant of Washington Water Power Co. Rising 19 ft, 8 in. above the rails, it is one of the tallest rail shipments ever made by A-C. This one will go on one of four 140,000-hp, 162-ft-head hydraulic turbines

TRANSLATIONS AVAILABLE — The Department of Commerce will begin publication in January of a periodical planned to serve as a central source of information in the United States on Russian and other technical translations available to science and industry.

The periodical "Technical Translations" will be published semimonthly and will list and abstract translated material available from U. S. government sources, cooperating foreign governments, educational institutions and private sources. It will be available at $12 a year from Department of Commerce's Office of Technical Services.

—EW—

WORRIES—The Chamber of Commerce, from a recent current opinion poll of businessmen, lists the following biggest business worries in this order:

1. Inflation and the need for federal spending control
2. Need for labor reform
3. Need for tax reform
4. Government control of business and agriculture
5. Government competition with business enterprise
6. Federal government interference in education

All this could represent one gigantic headache.

—EW—

HOME MARKET — Of the 50,000,000 homes in the United States today, 15% were built before 1920. Thirty million have not been painted in 10 years; 16 million have no central heating; 9 million no hot water; 9½ million have no bath tubs.

These figures make one wonder why the industry doesn't have a better program to sell this practically inexhaustible modernization market for electrical products.

—EW—

PRODUCTIVITY—A. C. Monteith, Westinghouse vice-president, told

the Indiana Electric Assn. that his company's power-up program is part of the economic push that will be needed to serve the population tomorrow.

By 1965 the population will have increased 17% to 193,000,000, while the work force will only go up 13% to 72,000,000. Productivity, however, will have to increase 40% to maintain the standard of living at its present rate of improvement. The answer, of course, is kilowatt-hours applied in the right places.

—EW—

GIANT—The boiler drum for one of the 325,000-kw units being added to Pacific Gas and Electric's Pittsburg power plant weighs 218 tons.

At about the time you are reading this, constructors will be facing the problem of raising it to a height of 164 ft.

Wear hard hats, men.

—EW—

Recently dedicated at National Reactor Testing Station, Idaho, was a prototype of the Argonne Low Power Reactor, designed for the military to provide light and heat in the remote Arctic. It will generate 200 kw of electrical power and 400 kw of space heating.

—EW—

THUMBS DOWN—A group of engineers attending the American Society of Mechanical Engineers meeting in New York was told that they are frequently not considered for management positions because their view of industrial operation is frequently too narrow. Presumably, they were cheered up by broad hints that other professions are similarly myopic.

V. Donald Schoeller, director of management development for Remington Rand, pointed out that industrial administration requires a broad outlook, and then cited examples of deficiencies in this skill that involved not only engineers but accountants, marketing experts, labor relations men, purchasing personnel and others.

—EW—

RETIRED—Art Brown, Allis-Chalmers manager at Los Angeles for 11 years and former PCEA director, has announced his retirement after 36 years with the company.

He is well known to many members of the Los Angeles and San Francisco Electric Clubs and AIEE members.

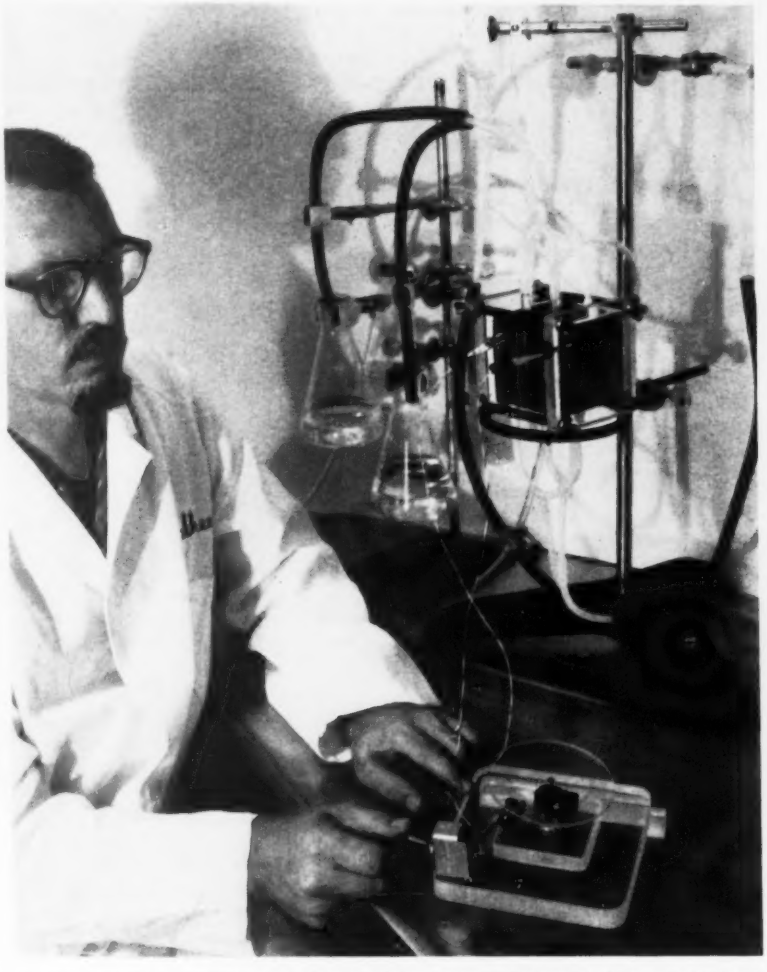
In the letter announcing his retirement, he expressed intentions of associating with a manufacturers agency. His home address is 229 W. Upsal St., Philadelphia 19, Pa.

—EW—

Professor Benjamin H. Spurlock Jr. of Boulder, Colo., has been given the grade of Fellow by the Council of the American Society of Heating & Air Conditioning Engineers. Spurlock is professor of mechanical engineering at the University of Colorado and director of the university graduate studies, department of mechanical engineering. He has a long and distinguished career in the field of education, engineering and air conditioning science.

—EW—

Heavy rains caused a slide of rock and earth that covered the foundations of Seattle City Light's high Gorge Dam and halted concrete placement for a few days. An estimated 14,000 cu yd of the unwanted material had to be removed. There were no injuries.



Dr. Ross A. Quinn, scientist in Lockheed Missile Systems Division's electrochemical laboratory, demonstrates how a fuel cell converts chemical energy directly into electric power to operate motor that spins plastic disc. It was predicted that a fuel cell powerful enough to power autos and even planes could be developed within five years. Lockheed scientists are now getting almost 100% fuel utilization with cells they have developed—cells that differ from the conventional battery in that the electrichemical fuel is stored outside so the components of the cell are not consumed in the electrode reactions

In Idaho Power's brand new East Gate Substation at Twin Falls, Idaho, CM-OT control cable is used on control circuits involving transformers, regulators, metering devices and circuit breakers. Much of the equipment is located in the yard, with cables going underground and up into the main control board.

"We expect 30 years' service from this direct-burial cable," says Idaho Power Company

On its substations along the Snake River, Idaho Power Company uses a direct-burial cable that eliminates the need for conduit or pipes . . . provides complete resistance to soil alkalinity, severe temperature fluctuations and active rodents, as well as excellent mechanical protection.

It's Okonite's Watertite-Okoprene control cable with CM-OT* finish—a lightweight, flexible cable of great compressive strength. Heart of CM-OT construction is a corrugated bronze tape that gives unusually high compressive strength. The corrugated tape is bonded to a tough wall of Okoprene, reinforced by an Okoprene-filled tape overall. This composite covering provides a permanent barrier against rodents, moisture, soil alkalies, acids, oils, sunlight or mechanical damage.

It will pay you to learn more about CM-OT quality cable constructions with corrugated bronze tape protection. Send for Bulletin WE-1121. The Okonite Company, Passaic, New Jersey.

Corrugation = strength plus lightness

Just as corrugated construction adds strength to underground pipes, so corrugation of shielding tape permits the construction of CM-OT—the stronger, lighter, more flexible and more easily handled cable.

* Patent No. 2722562

where there's electrical power . . . there's **OKONITE CABLE**

6201

faster, lightweight, versatile

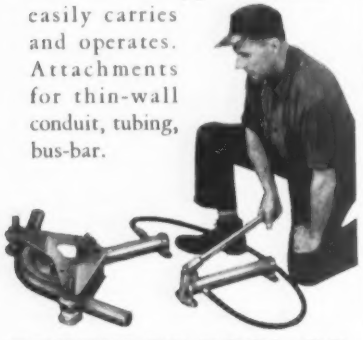
HYDRAULIC CONDUIT BENDERS

Bend ½" to 4" conduit . . . 90° in one stroke . . . with the powerful new GREENLEE No. 884 Power Bender, above.

Many advanced features: Portable . . . one set of pipe supports for all 10 sizes . . . easy pipe removal . . . easy-to-read scale . . . identical bends easily reproduced.

90° bend in 4" conduit takes 4 minutes with GREENLEE Portable Power Pump shown . . . only 30 seconds with larger GREENLEE pumps!

Bend ½" to 2" conduit . . . 90° in one ram stroke . . . with GREENLEE No. 880 Hydraulic Bender, below, hand-pump or power-pump operated. Handles all sizes from ½". One man easily carries and operates. Attachments for thin-wall conduit, tubing, bus-bar.



GREENLEE TOOL CO.
1799 Columbia Avenue, Rockford, Illinois

PESKY IONS – Westinghouse lamp engineers are experimenting with ultraviolet light that will produce sizable quantities of negative air ions. Researchers have concluded that air charged with positive ions causes human discomfort in the form of fatigue, dizziness, headache, asthma and other ills.

Conversely, there is a definite improvement in comfort when negative ions are present. In fact, wounds healed more rapidly, hay fever was relieved and even arthritis and rheumatism reduced. Who said nobody does anything about the weather?

—EW—

The Los Angeles Board of Education has reported an increase in the number of students enrolled in science and mathematics courses. Considering the five-year period from 1952 to 1957, beginning algebra students increased 85%, geometry 82%, advanced algebra, solid geometry and trigonometry 153%, chemistry 60%, physics 27%. During the same period total enrollment has increased less than 40%.

—EW—

ROLE OF ECONOMICS – Commenting on the value of economics training, P. H. Henson, chief engineer of the Lincoln, Nebr., Telephone & Telegraph Co., said, "Without a complete understanding of our economic system, the role of the public utility in this system and the basic principles of engineering economics, the engineer can easily be the most expensive employee on the pay roll."

—EW—

According to the National Garden Bureau, used light bulbs scattered around the flower and vegetable gardens will repel rabbits and other varmints. Some smart dealer is going to figure out a good merchandising gimmick based on this fact.

—EW—

.0000001—Measurement accuracies of one ten-millionth of an inch will probably be attained in the United States within the next 10 years.

Today industry has practical requirements for a seven-decimal-place accuracy in the construction of its space vehicles. . . The British inch

George Merz of Portland General Electric Co. has something to smile about. He designed the device that he is holding, and it is now being marketed by Merco Utility Supply Co., 5205 S. W. 19th Drive, Portland 1, Ore. Purpose of the gadget is to seal tree wounds after trimming. The lightweight brush, supplied with either a 4- or 8-ft extension, has a center-feed from a pump reservoir in the base. Triggering the pump supplies a measured amount of the sealer to the brush through a light-weight, extremely durable fiber-glass tube. The operator can work from a ladder or platform at the same range as he does with long-handled trimming tools

of 2.539998 cm is being officially changed to conform with the American inch of 2.54 cm. . . And speaking of minute quantities, atom scientists talk about a "jiffy"—the time required for light to travel 1 cm; and a "barn," which is an area used to measure atom action. The barn is expressed by a fraction of 1 over 1 followed by 24 zeros. Of course, a "shed" is one-millionth of a "barn."

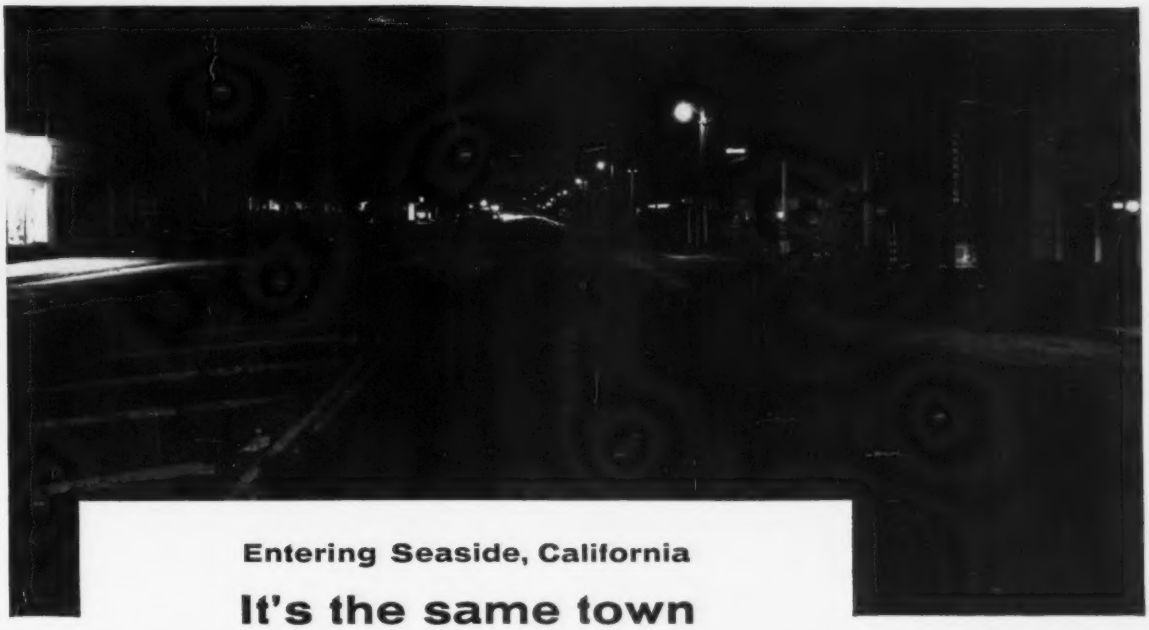
—EW—

Great Britain's Central Electricity Generating Board is contemplating a 1,500,000-kw thermal station to be located on the fringe of the East Midlands coal fields.

—EW—

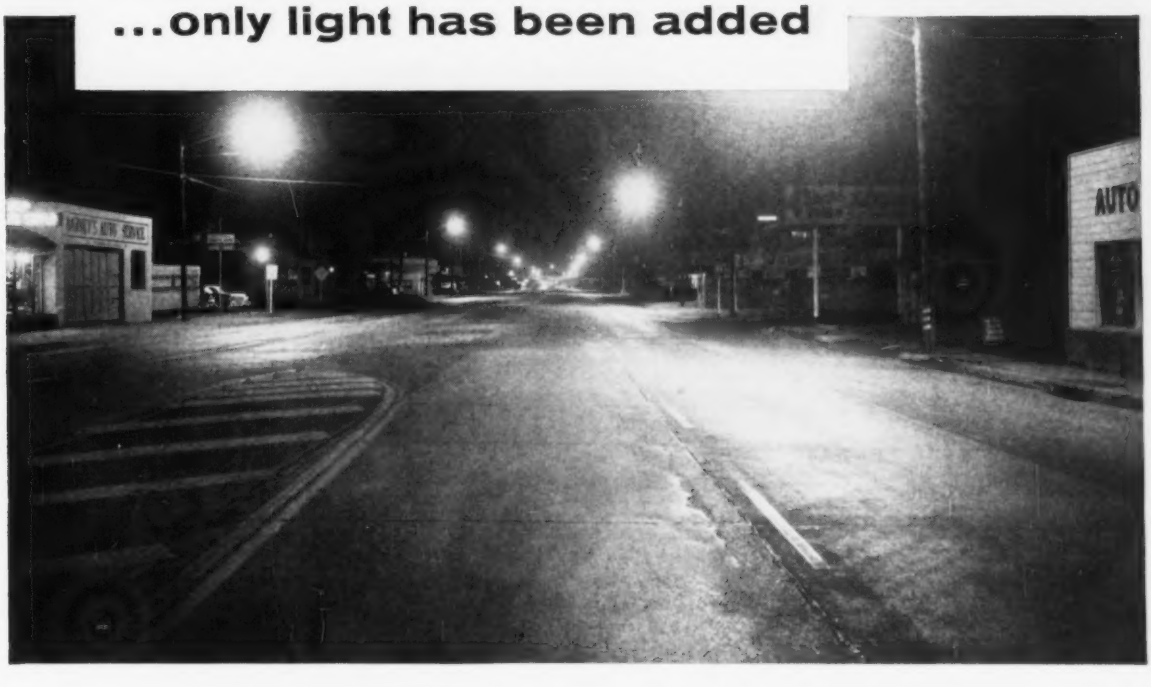
CAPABILITY UP – EEI's semiannual electric power show survey estimates the country's total generating capability by the end of 1958 will be 146,000,000 kw. Net capacity additions this year will be about 15,000,000 kw and the gross margin as of December is estimated to be 29.6 million kw.

EEI's president, Jack Corette, incidentally, has pointed out that the projected installed capacity for the U. S. in the next four years will equal Russia's total generating capacity as of today.



Entering Seaside, California

It's the same town ...only light has been added

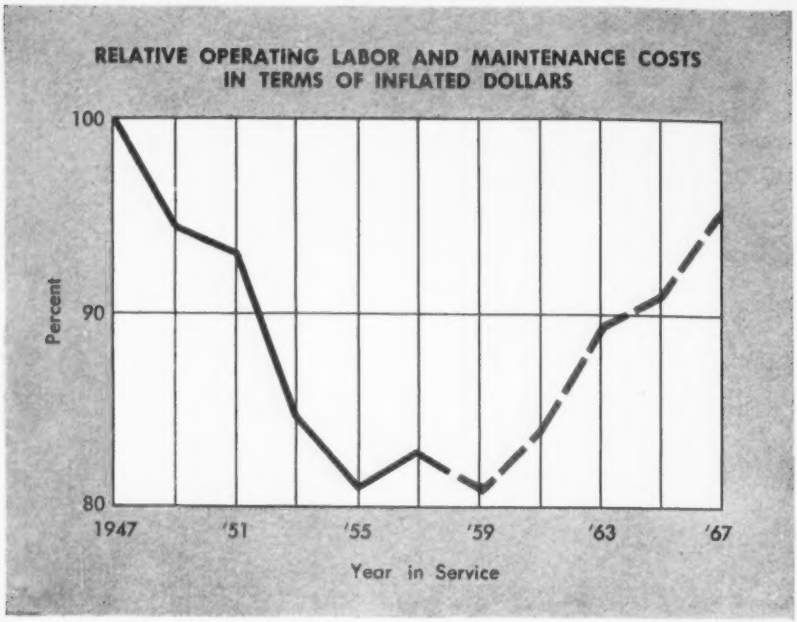


But what a difference modern street lighting makes. Streets are safer, business is better... the whole town looks more alert and attractive. *Your community can do the same.* Take your civic lighting problems to P. G. and E. Our experts will draw up a long-range street lighting plan without cost or obligation.

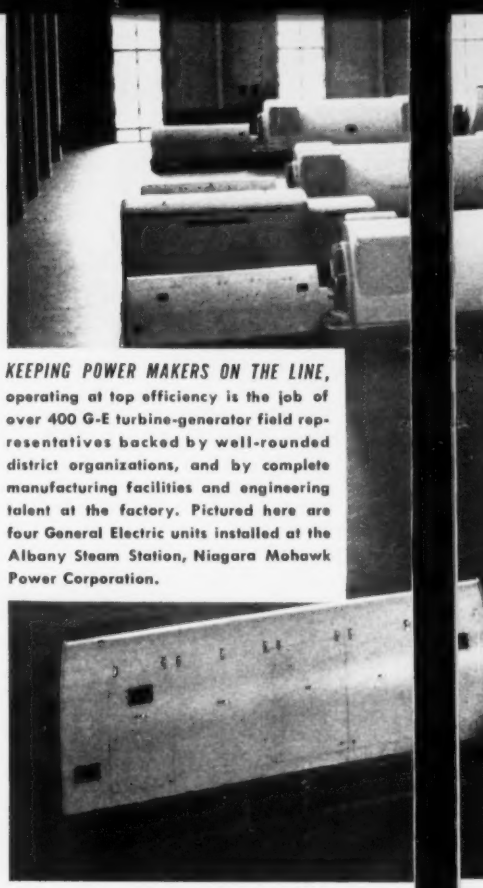
For a free lighting survey, contact your local P. G. and E. office

P·G and E·

Pacific Gas and Electric Company

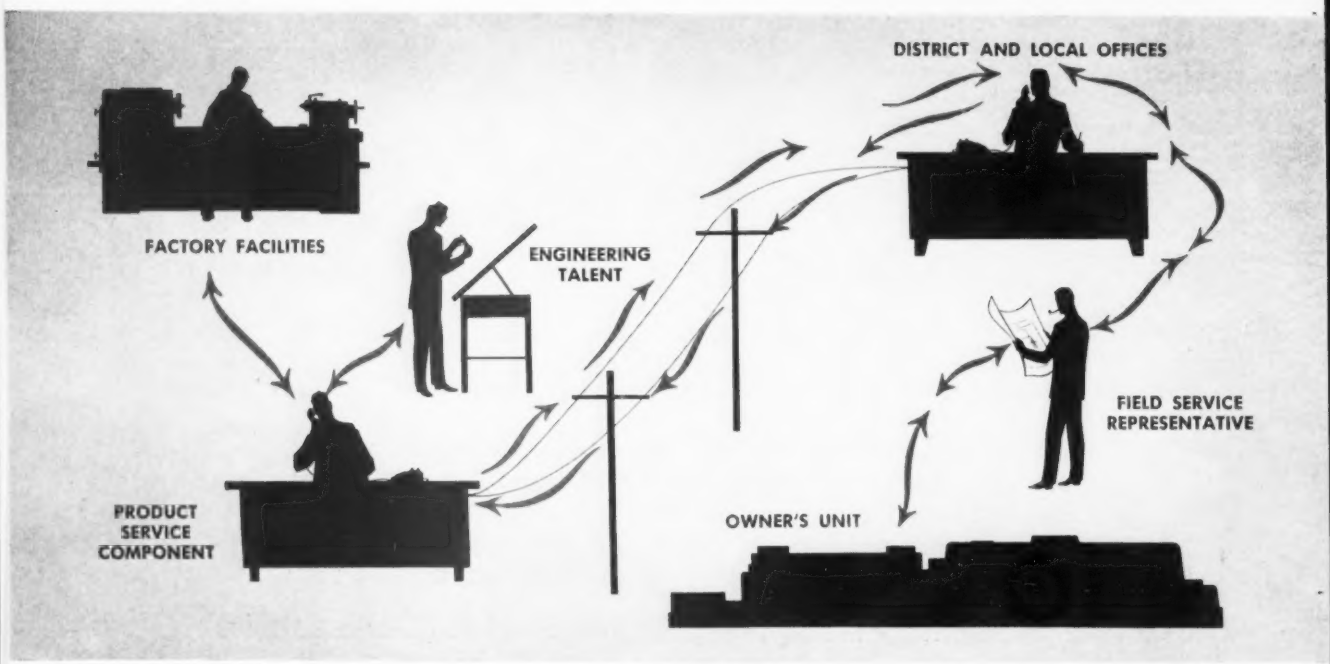


LARGER UNIT SIZES and improved heat rates have helped utilities reduce operating labor and maintenance costs. However, if these costs are projected at the 1947–57 inflationary rate, this trend will be reversed as indicated above. Accordingly, General Electric is constantly strengthening all phases of its present intensive efforts that help in *KEEPING POWER MAKERS ON THE LINE*, thereby promoting even more economical generation of electricity.

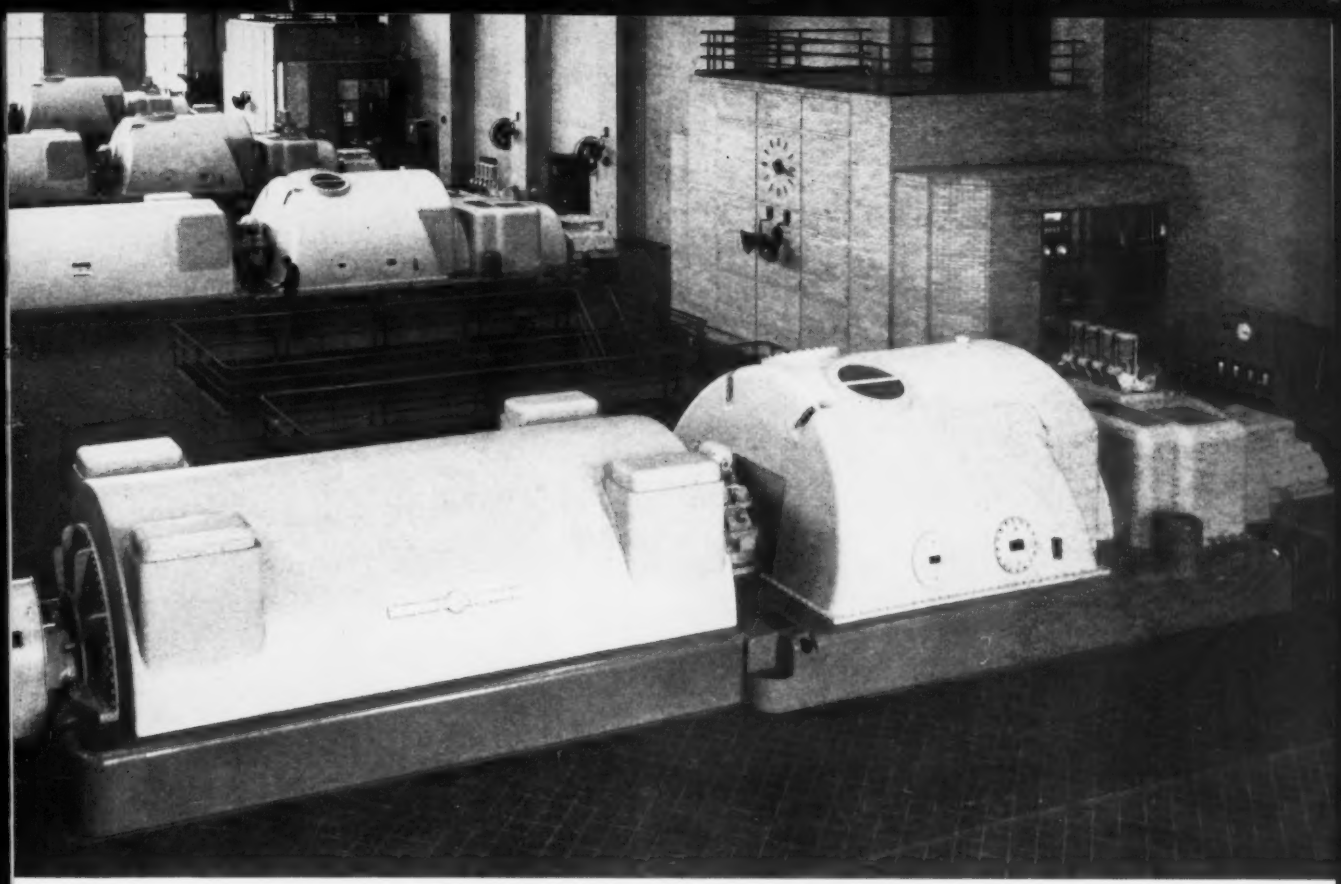


KEEPING POWER MAKERS ON THE LINE, operating at top efficiency is the job of over 400 G-E turbine-generator field representatives backed by well-rounded district organizations, and by complete manufacturing facilities and engineering talent at the factory. Pictured here are four General Electric units installed at the Albany Steam Station, Niagara Mohawk Power Corporation.

Completely integrated service helps keep



TWO-WAY FLOW OF SERVICE INFORMATION through the Product Service component enables factory "know-how" to supplement the efforts of your field service representatives, and permits design and manufacturing specialists to take full advantage of field operating experiences.



General Electric power makers on the line

From the time an order is placed, through design, manufacturing, installation, and during the life of every unit, a well-trained service team is constantly available. Turbine-generator field representatives and local specialists are backed by a Product Service organization at the factory. This component channels all incoming and outgoing information and coordinates the application of factory talents and facilities to individual owner's problems.

Here are some ways General Electric service helps maintain the product superiority built into each unit:

Installation Service Study Team—*helps simplify field erection by continually studying methods for reducing installation time and cost. It also seeks easier inspection procedures by suggesting appropriate improvements in equipment design.*

Performance Interpretation—*helps owners evaluate abnormal sectional pressures and efficiencies, loss of capacity, and other operating irregularities. General Electric initiates tests to prove new designs, and aids owners in conducting their own performance tests on duplicate machines.*

Engineering Consultation—*is continuously available from factory components. Here electrical and mechanical engineers specialize in providing prompt supporting attention to problems that may arise during the life of your unit.*

Materials and Processes Laboratory Assistance—*is offered for any unusual service requirement. Nearly 300 physicists, chemists, specialists and technicians are available for field studies, consultation, and advanced non-destructive testing.*

Maintenance Task Force—*establishes procedures to speed repairs and minimize outages by: assuring efficient repair routines, carefully analyzing shop operations to eliminate uncertainties, and coordinating our action with owner's requirements.*

Material Procurement Advantages—*help reduce maintenance downtime. Large volume production, a backlog of currently approved materials such as composite forgings, tubing, and bar stock, and an efficient purchasing organization constitute powerful aids in meeting emergency requirements.*

Complete service—designed to provide maximum assistance and satisfaction to the owner—is part of the "added value" you purchase with every General Electric steam turbine-generator. For more information, write for publication GED-3666, Large Steam Turbine-Generator Department, Schenectady 5, New York. 254-76

Progress Is Our Most Important Product

GENERAL ELECTRIC

Outdoor lighting at Del Webb's HiwayHouse Hotel, Phoenix, Arizona, comes on automatically at night, goes off in the morning. Underground wiring is protected by 3200 ft. of SPANG HD Galvanized Conduit in this seven-acre patio. Hotel has 250 rooms, can accommodate 650 guests.

SPANG Conduit Protects HiwayHouse Hotel Wiring

"We want to maintain our record for quality installations," says Mr. Ernest E. Cannon. "Therefore we always use dependable, durable materials. That's one reason why we use SPANG Conduit regularly."

At the $3 million Del Webb HiwayHouse Hotel, one of Phoenix, Arizona's newest and most attractive inns, over 6,800 ft. of SPANG Galvanized Conduit serves elaborate outdoor lighting, indoor power requirements and telephone lines to all rooms.

SPANG Conduit helps maintain rush schedule

Mr. Ernest E. Cannon, owner of Cannon & Wendt Electric Company in Phoenix, says: "The contractor's schedule called for speedy construction. Because SPANG Conduit is easy to work with, there was no delay in making this installation. Bending was fast and accurate; the excellent hot-dipped galvanized finish took even the severest bends with no trouble."

Conduit serves many purposes

Buried underground, SPANG Conduit protects automatic outdoor lighting that illuminates swimming pool, trees, shrubs, parking lot, buildings and patio. Inside, all lighting, air conditioning, food preparation and phone system wiring is carried by conduit runs in ceilings and walls.

Make SPANG your first choice

It's *quality-controlled* during manufacturing, and tested and inspected to provide you with *top-quality* conduit every time. Your local SPANG Distributor carries the complete line of conduit and fittings. Let him serve you on your next job.

Architect: Victor Gruen, New York, N.Y.

General Contractor: Del E. Webb Construction Company, Phoenix, Ariz.

Electrical Contractor: Cannon & Wendt Electric Company, Phoenix, Ariz.

SPANG Distributor: Brown Wholesale Electric Company, Phoenix, Ariz.

SPANG® CONDUIT

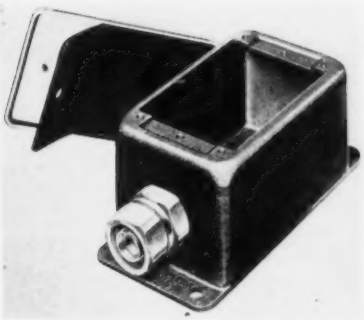
THE NATIONAL SUPPLY COMPANY

Subsidiary of Armco Steel Corporation

TWO GATEWAY CENTER, PITTSBURGH, PA.

PRODUCT NEWS

New Designs and Applications



Liquid-Tight Box

(1) *Appleton Electric Co.*, 1701 *Wellington Ave., Chicago* 13, *Ill.*

A new line of liquid-tight, dust-proof junction boxes is being introduced by this company. Known as the JIC series, it has been approved for use either as a junction box or a wiring device box. Box bodies are of one-piece welded construction, and are designed with ample wiring room. A full width bridge provides additional screw support and proper alignment. Boxes are equipped with one Sealtite conduit connector, and one conduit hub. Additional hubs and connectors may be mounted on the boxes. Covers have captive screws and neoprene gaskets for added wiring protection.

Industrial Electric Heater

(2) *Electromode Division, Commercial Controls Corp., Rochester* 3, *N. Y.*

A built-in thermostat makes control wiring unnecessary in this new commercial and industrial heater. Another feature is a fan delay switch that prevents the heater from blowing cool air during initial operation. Two capacities are available: 5 kw with an output of 17,075 Btu, and 10 kw with an output of 34,150 Btu. The 10-kw model is basically two 5-kw units fixed side by side, each retaining its thermostatic control. An automatic safety switch breaks service to the heater in the event of motor failure or stoppage of air flow. It resets itself.

Mercury Luminaires

(3) *Westinghouse Lighting Division, Edgewater Park, Cleveland, Ohio*

A new line of mercury luminaires for street lighting offered by this company is supplied with 400-w mercury lamps, and is available with or without built-in ballast. The new luminaires have one-piece die-cast aluminum housings for high strength and low weight. The built-in-ballast model weighs 46 lb, units without ballast weigh 20 lb. A selection of refractors gives a choice of either type II or type III light distribution.

Public Service Co. of Colorado recently became the first Western utility to install Line Material Industries' new SRT, the self-regulating distribution transformer. The first unit, rated 25 kva-2,400 v, was installed on a 2.4/4.16-kva feeder in north Denver to serve a small residential and commercial area. PSC linemen shown installing the SRT are Lark Williamson, right, and Lewis Ernst, left

Microwave Equipment

(4) *Communication Products Department, General Electric Co., Electronics Park, Syracuse, N. Y.*

A new series of microwave equipment to operate in the 6-kmc band is available from this company. Addition of the 6-kmc line to the existing 2-kmc line gives microwave users an opportunity to combine the advantages of both equipments in their systems planning.

Fusible Switches

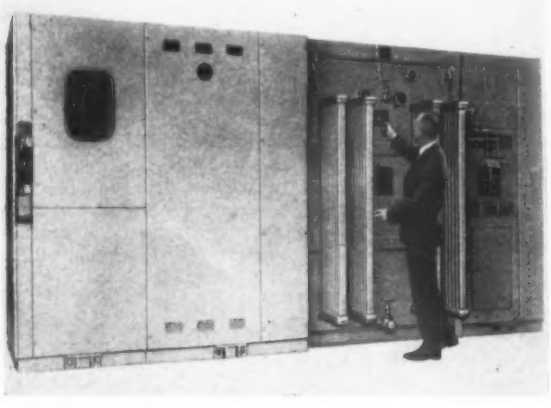
(5) *Federal Pacific Electric Co., 50 Paris St., Newark, N. J.*

A new line of quick-make quick-break fusible switches and panelboards is announced by this company. Ratings available range from 30 through 1,200 amp, 250 and 600 v. Four chief features are: visible blades for maximum safety, high-pressure fuse holders, deionizing arc quenchers and integral handle mechanism. Three different sizes are available. They are specifically designed to meet the increased power requirements of modern industrial and commercial systems.

Flush-Type Header

(6) *National Electric Products Corp.*, 140 *Stanwix St., Pittsburgh, Pa.*

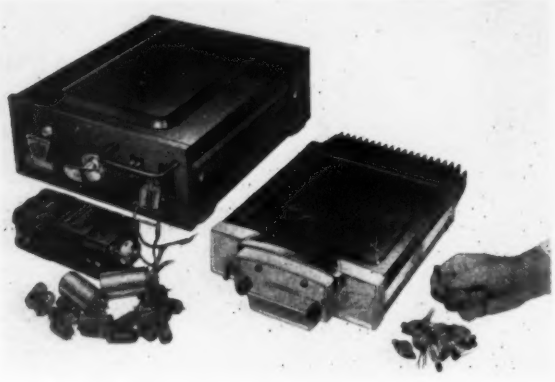
Latest addition to this company's headerduct line is a flush-type, king-size header. Dimensions are 2½ in. deep, 10 in. wide, with a cross section of 20.294 sq. in. The duct is made of 14-gage cold rolled steel with die cast aluminum cover plates that incorporate trim for a linoleum asphalt or vinyl tile. An aluminum extrusion on either side of the duct provides the screed line for concrete and finish trim for tile. Provides maximum feeder capacity for telephone or power application. A complete line of fittings is available. Standard length is 5 Shown at the left in the photograph is R. I. Witt of Bennett Associates Inc., San Francisco, representative for National Electric. At right is Larry Halpgren of Foothill Electric, Oakland. Installation is going into the Kaiser Center building.



Packaged Substations

(7) *I-T-E Circuit Breaker Co., Transformer & Rectifier Division, Philadelphia* 30, *Pa.*

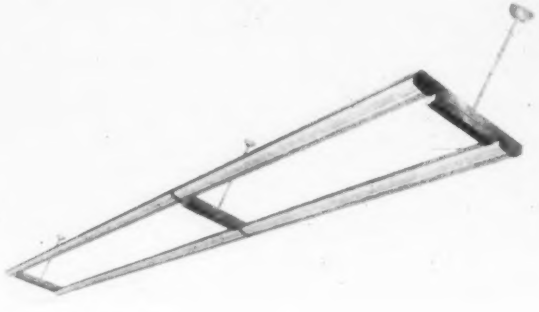
Nine new models of its packaged substations, extending coverage of the line to more than 90% of all commercial and industrial applications, have been announced by this company. The packaged substations are completely pre-engineered load centers for stepping down primary voltages. They contain the transformer and its primary protective and secondary distribution devices. The units are now available in a wider range of voltage and amperage ratings, in more combinations of primary and secondary devices, and for the first time with sealed dry-type transformers. Units are available in ratings from 45 to 3,000 kva for stepping down primary voltages from 2.4 through 13.8 kv to 208/120 through 600 v. Four types of transformers are available in the units: oil filled, askarel filled, and sealed or ventilated dry types.



Small Mobile Radio

(8) *Motorola Inc., Communications & Industrial Electronics Division*, 4501 *W. Augusta Blvd., Chicago* 51, *Ill.*

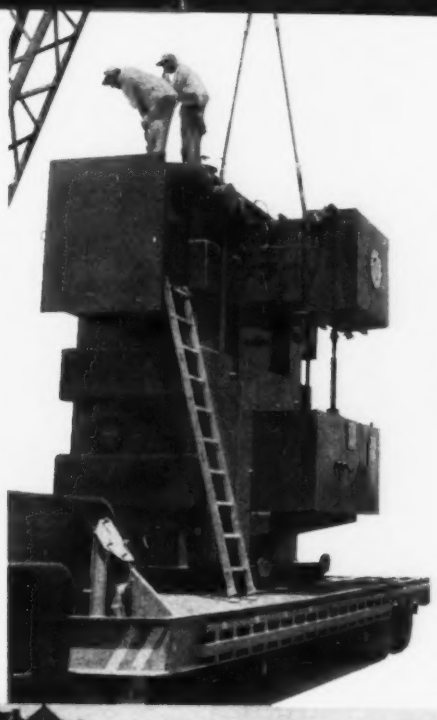
A new two-way mobile radio half the size and using only one-third the power of ordinary units has been announced by this company. More than 20 transistors are utilized in the new radiophone. Also announced is the development of pocket-sized transmitters and receivers. These weigh less than 4 lb and are easily fastened to a person's belt. Range varies from one to 10 or more miles, depending on the type of station being communicated with.



Indirect Lighting

(9) *Sunbeam Lighting Co.*, 777 *E. 14th Place, Los Angeles* 21, *Calif.*

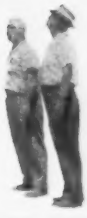
A new, totally indirect lighting system is announced by this company. It is said to give maximum visual capacity in work areas at the same time it protects the eyes against glare. Features include minimum use of cross channels in the design. They are spaced eight feet apart, and also serve as ballast housing. The fixtures have a patented spring-leaded leveling device. While it is basically designed for continuous rows, the Sightline may also be mounted individually.



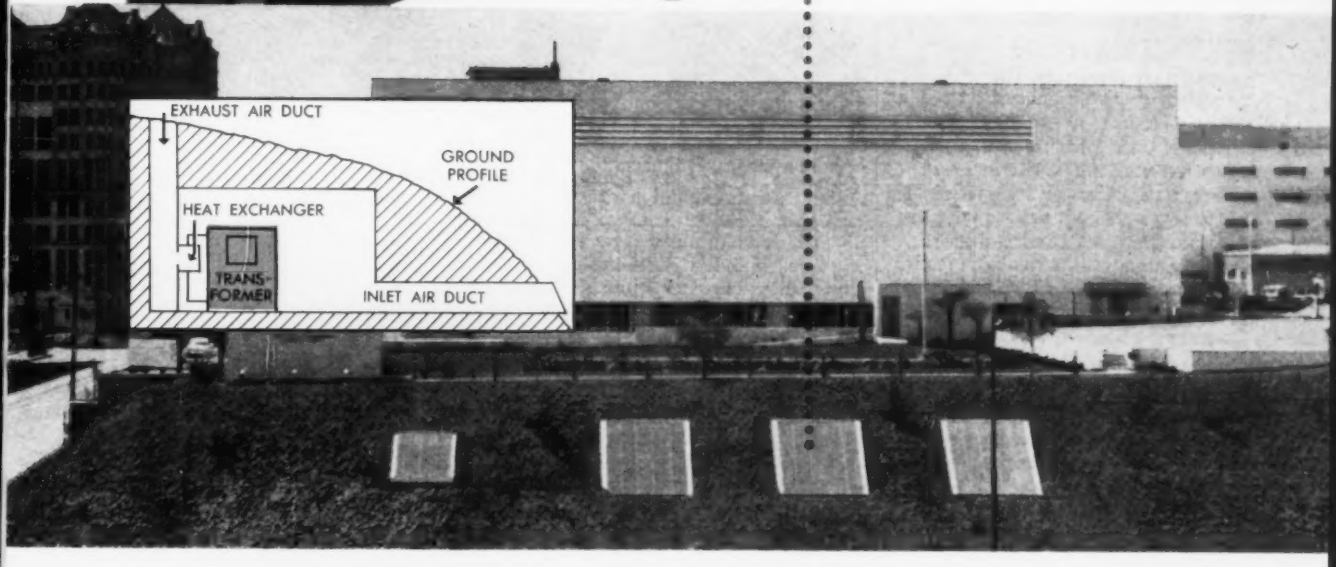
60,000 Kva

of Pennsylvania Transformer Capacity

GOES UNDERGROUND



in Los Angeles distributing station



Special cooling arrangement used in installation of three 20,000-kva load tap changing transformers

A combination of economic and esthetic factors prompted the City of Los Angeles, Department of Water and Power to construct an *underground* distributing station to supply power to the city's rapidly growing civic center. Studies indicated that an underground station would cost considerably less than a surface structure—particularly a surface structure that would harmonize architecturally with the large civic center buildings of the present and future.

Three 20,000-kva Pennsylvania Load Tap Changing Transformers are now "on the line" in this new underground distributing station. Despite space limitations, the transformers fit easily into their individual chambers—thanks to the compactness of Pennsylvania's new rectangular tank design. To solve the problem of cooling, transformer oil is pumped through flexible connectors to special oil-to-air heat exchangers (two for each transformer) that are sealed in the walls of outgoing air ducts. Air is drawn through inlet tunnels on the opposite side of the room, after which it passes around the transformer, through the heat exchangers, and into the outgoing ducts.

With more than thirty years of experience in the design and manufacture of power transformers, Pennsylvania can satisfy the usual as well as the unusual in installation requirements. For a discussion of your needs, contact Pennsylvania Transformer Division, Box 330, McGraw-Edison Company, Canonsburg, Pa.

McGRAW-EDISON

PENNSYLVANIA POWER TRANSFORMERS

LABORATORY CONTROLLED...

Crapo

GALVANIZED STEEL STRAND FOR GUY, MESSENGER and OVERHEAD GROUND WIRE

The high, uniform, consistently-dependable quality of Crapo Galvanized Steel Strand is the direct result of close laboratory control over each step in manufacture. All wires used in forming a particular size and grade are produced from steel of selected analysis, carefully processed under technical supervision and stranded on precision machines. Both wire and finished strand are subjected to prescribed laboratory tests to insure the desired end result.

Heavy, uniform, tightly-bonded zinc coatings, applied by the famous Crapo Galvanizing Process, provide maximum resistance to corrosion.

Write for booklet OG-25 containing "Sag and Tension Data for Overhead Ground Wire."

INDIANA

STEEL & WIRE CO., INC., Muncie, Indiana

Hydraulic Derrick

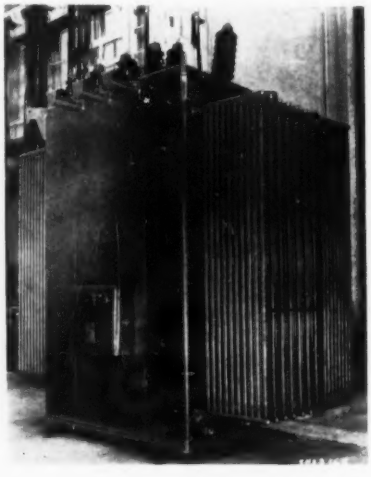
(10) *Utility Body Co.*, 1530 *Wood St., Oakland 7, Calif.*

A new utility model hydraulic derrick offered by this company is available with side movement allowing it to reach 9 ft to either side from center line of truck chassis. Sheave heights are 25, 27 and 29 ft. An extension of the derrick side legs allows an additional 2 ft in each of these sheave heights. The unit is designed to go to the ground and apply 3,000 to 4,500 lb down pressure on derrick-supported diggers. It has a lifting capacity from 2,500 lb with sheave at ground level to 12,500 lb at maximum elevation.

Labeling Device

(11) *Dymo Corp.*, 2546 10*th St., Berkeley, Calif.*

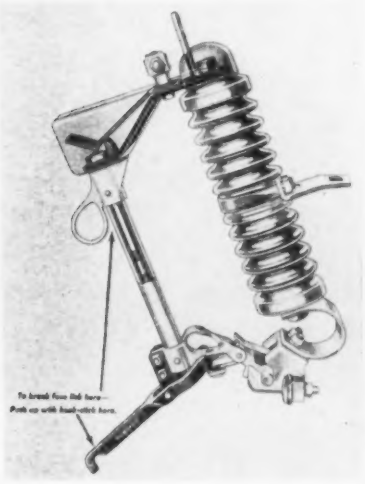
Embossed labels can now be made on the spot with a new labeler and tapes available from this company. Tapes available are vinyl plastic, aluminum, monel, copper, stainless steel, zinc, lead, etc., and can have pressure-sensitive adhesive backing. The tapes are also available without the adhesive. Designed for quick, economical field identification or inventory system.



Substation Power Transformers

(12) *Westinghouse Electric Corp., Box* 2099, *Pittsburgh* 30, *Pa.*

A new standardized design core-form substation transformer is available from this company in all ASA standard ratings, 750 to 10,000 kva, three phase, 69 kv and below. Internal tank bracing permits the streamlined appearance and is said to reduce maintenance. Accessories are in a locked weatherproof cabinet at eye level.



Load Break Lever

(13) *Hubbard & Co., 200 S. Michigan Ave., Chicago 4, Ill.*

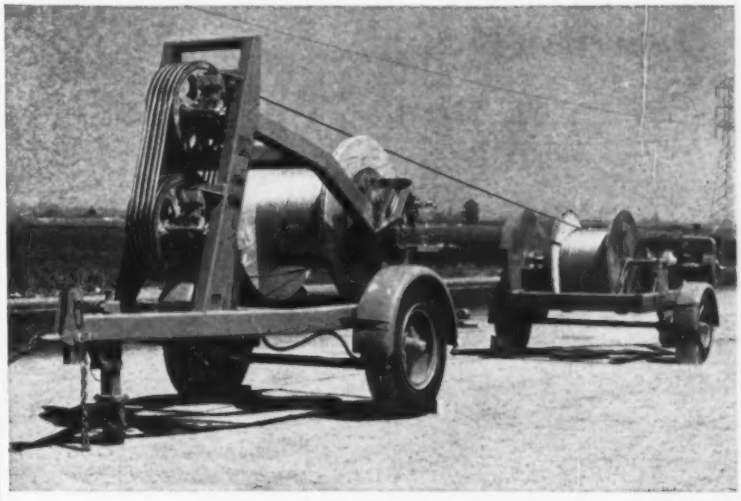
A new mechanical load breaker can be attached in minutes to any Hubbard Faultmaster cutout. Operation requires an upward thrust of the hookstick, which breaks fuse inside the tube for positive interruption.

Photoelectric Control

(14) *Revere Electric Mfg. Co., 7420 Lehigh Ave., Chicago 48, Ill.*

Two of this company's street lighting luminaires are now wired to accommodate light sensitive controls. The photoelectric control unit plugs into the top of the side-mounting Star-Lux head and into the socket housing cover of the Urban-Lite. The photoelectric control is said to meet the new proposed EEI-NEMA standards for plug-in controls. It is factory adjusted to turn on at 1.0 f-c.

Available Now for Immediate Delivery



PENGO 5000-STR-1 combination tensioner and reel dolly (foreground) has Neoprene-lined bullwheels to take conductor sizes up through .96" (556,500 CM), handles reels to 34"x72" weighing to 5,000 lbs. PENGO 5400 CP-TR Cable Puller (at rear) pulls directly onto reel. It is rated at speeds up to 3 m.p.h. and tensions to 1000 lbs. line pull. For heavier tensions and more positive control, the new economically-priced #5500 PENGO Bullwheel Cable Puller is now available.

...a PENGO Reel Dolly & Bullwheel Tensioner Combination FOR ONLY $3,000!

PENGO's new combination Tensioner and Reel Dolly is available for immediate shipment – permits your use NOW.

Take advantage of this experience to guide you in budgeting these units for your various areas.

Especially designed for small areas, this very economically-priced tensioner eliminates the need for a separate reel dolly – and the extra man.

PENGO offers more than 40 models of Bullwheel Tensioners and Bullwheel Cable Pullers for stringing every size of conductor!

Write today for literature

PETERSEN

B-6

ENGINEERING CO., INC.
Santa Clara, California
Dept. F1

Please send PENGO Tension-Stringing equipment data to:

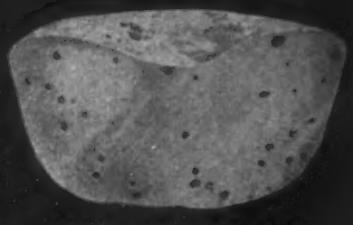
Name_____

Firm_____

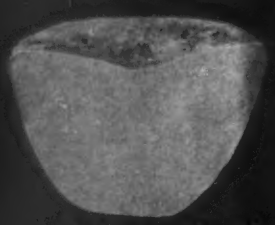
Address_____

City_____ State_____

wonder where the BUBBLES went?



Visible voids spot the test pour of an improperly-fluxed heat of aluminum.

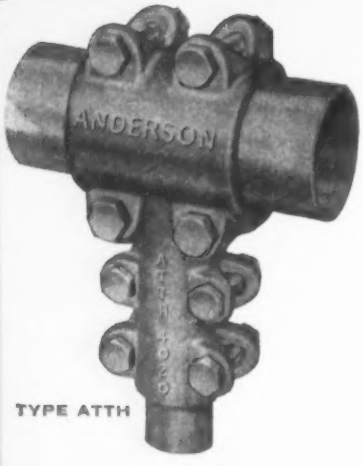


A typical cross-section of sound, bubble-free Anderson Aluminum test pour.

QUALITY CONTROL from the very start removes any chance of "gas porosity" weakness from

ANDERSON *Aluminum*

SUBSTATION CONNECTORS



TYPE ATTH

ANDERSON PREDETERMINES LONGER LIFE . . . greater efficiency . . . and higher tensile strength by putting to work the *probing, fact-producing* experiences of 30 years of Aluminum Connector manufacture.

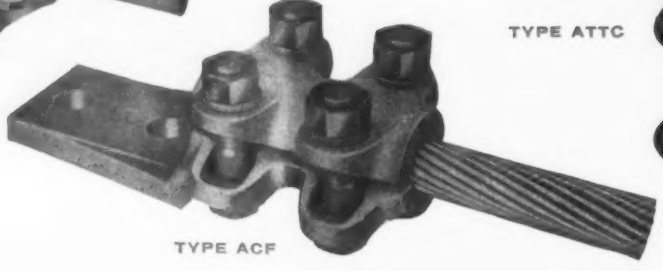
Insuring "high density" by completely eliminating *pin-hole gas porosity* in aluminum castings is just one of Anderson's check-point measures in the production of connectors of outstanding quality. Every heat of aluminum is checked to guarantee that no connector will fail in service because of *voids* in the casting created by *tiny gas bubbles!*

Any Anderson Representative can give you the full, detailed story of our exacting QUALITY CONTROL measures . . . consult your nearest Representative or write to the home office.

Aluminum & Bronze POWER CONNECTORS • CLAMPS • FITTINGS • ACCESSORIES
for **SUBSTATION • TRANSMISSION • DISTRIBUTION**

ANDERSON ELECTRIC
CORPORATION
BIRMINGHAM 1, ALABAMA

TYPE AUR



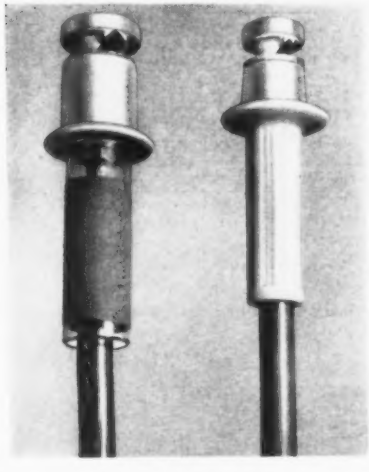
TYPE ACF

TYPE ATTC

Connection Cabinet

(15) *Keystone Mfg. Co., 23328 Sherwood Rd., Warren, Mich.*

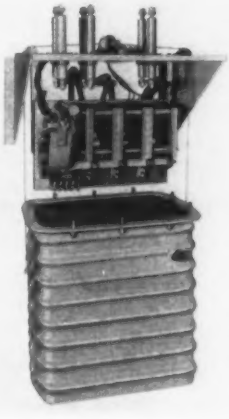
A new type of branch circuit connection cabinet designed for use as an integral part of standard wireway runs is offered by this company. The new cabinets feature faster and easier wiring since shorter wireway runs are possible, according to the manufacturer. Branch circuit connections can be tapped into main power lines by means of special solderless connectors. Each unit is equipped with 400-amp bus bars, solderless lugs, and a full length removable cover.



Temporary Jumper Clamps

(16) *A. B. Chance Co., Centralia, Mo.*

Two new styles of insulated jumper clamps to be used for by-passing work areas and for making temporary connections are offered by this company. Both types feature a wide-area, high-pressure connection with the V-shaped jaw of the aluminum-alloy head. The large series (at left) accommodates conductors ranging from 1/0 through 750 mcm stranded copper. The regular series has a wire-size range of No. 6 solid through 250 mcm stranded copper. Each type is made in four sizes to take jumper cable ranging from 4/0 10,000-v cable to No. 2 5,000-v cable. Connection is with a compression-type bronze connector.



Oil Contactor

(17) *Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.*

This company is introducing a new heavy-duty, oil-immersed contactor designed for applications from 2,000 to 4,800 v. Reduced size is an important design feature. It can be mounted in the same front-access, 34-in.-wide cubicle as used for air contactors of like rating.

New Developments

► Design changes have brought about size and weight reductions of about 15% in **Allis-Chalmers** vault network transformer. The new tank design, with its corrugated surface, both increases the cooling area and strengthens the tank.

► **Day-Brite Lighting** and **Bussmann Mfg. Co.** have developed a new method of equipping fixtures with externally fused ballasts. The new fuseholder, fuses and mounting bracket will replace the fusing system now being supplied in glass and plastic Day-Brite fixtures.

► **Emhart Mfg. Co.** has reduced prices on several models of its Skyworker. Improved production methods in the new plant at 760 Windsor St., Hartford 1, Conn., permitted the change. Skyworkers are also available on a new lease plan.

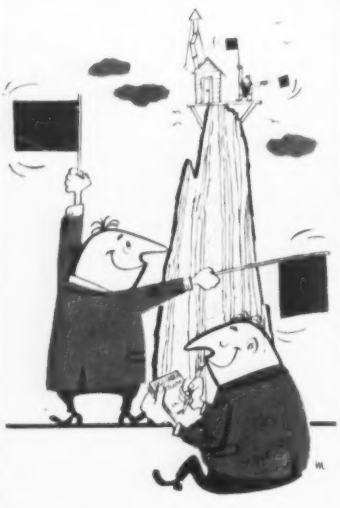
► **Square D Co.**, by redesigning its precision snap switches, cut production costs 60%, and at the same time achieved more accurate operating characteristics and longer life. A two-component plastic and metal assembly was replaced with a new one-piece precision molded nylon part.

► **Kuhlman Electric Co.** provides a new no-load tap changer as standard equipment on all substation transformers now. The new tap changer is constructed so that the rotor contacts function as free-acting crosspin universal joints. Eliminated is the problem of misalignment between rotor and stationary contacts.

► **S & C Electric Co.** has completely redesigned its type SM power fuses to match the higher system faults of today's transmission and distribution systems. A new principle employed is the use of boric acid as an interruption medium. The ratings are approximately 33% higher.

► **General Electric Co.** has a new line of standard high-voltage bushings, all of them completely interchangeable between transformers and circuit breakers. Only eight basic bushings will cover all applications in the standard voltage classes from 23 to 196 kv, inclusive.

► A new system for electric brazing solid and stranded wire, particularly copper wires, has been developed by Maurice G. Steele, development engineer of **Rome Cable Corp.** Steele's system centers around the use of two opposed mechanical metal clamps, one on each side of a standard carbon-block brazer using opposing electrodes. Advantages are: stronger brazes, minimum length of stiffened wire, minimum annealed length, and no distortion of wire shapes during the brazing operation.



OUR SALESMEN LOOK FOR BUSINESS EVERYWHERE

But just in case they've missed you, remember Incandescent Supply Co. has really complete facilities.

If it's electrical, you'll find it at ISCO . . . with service that compliments the best in quality.

INCANDESCENT SUPPLY CO.

OAKLAND
REDDING
SACRAMENTO
SAN FRANCISCO
SAN JOSE
FRESNO
LOS ANGELES

BULLETINS ETC.

(18) **FIXTURE CATALOG**—Lighting Dynamics has begun distribution of its new 163-page catalog of lighting fixtures. Featured are new fixtures designed by the engineering group that has been working since the new company was formed early this year. The catalog was designed so that it will be a lasting reference source. It features the Dewey decimal system of page numbering so new pages can be added in the proper sequence as new fixtures are introduced. Photometric information is calculated by the Zonal interflectance method. Write to the company at 802 W. Whittier Blvd., Whittier, Calif.

(19) **TEST AMMETERS**—A new 8-page catalog on its complete line of Tong Test a-c—d-c ammeters has just been released by Columbia Electric Mfg. Co., 4519 Hamilton Ave., Cleveland 14, Ohio. Information and illustration on eight types of instruments are shown.

(20) **PULVERIZER**—A planetary roll and table pulverizer for coal is the subject of a 4-page brochure, MB-58-1, now available from Foster Wheeler Corp., 666 Fifth Ave., New York 19, N. Y. Included are photographs, a cut-away drawing and a table of capacities and dimensions.

(21) **CONNECTOR GUIDE**—Available now from Anderson Electric Corp. is a handy guide to the company's complete line of electrical terminal connectors. Write to the company at P. O. Drawer 2151, Birmingham 1, Ala. Ask for catalog 57.

(22) **LIGHTNING ARRESTERS**—Features and applications of Thorex Dynagap lightning arresters manufactured by Ohio Brass Co., Mansfield, Ohio, are contained in publication No. 1402-H now available. A valve-type principle is used in the design of the arresters.

(23) **FIXTURE CATALOG**—EJS Lighting Corp., 921 E. Pico Blvd., Los Angeles 21, Calif., has just published a new 72-page catalog. It is divided into four basic sections: residential, architectural and special design, bullets and portables.

(24) **AUTOMATIC RECLOSERS**—Bulletin GEA-6671 of General Electric Co., Schenectady 5, N. Y., describes the features and operation of the company's complete line of type HR automatic reclosers. The equipment is said to provide economical overcurrent protection for suburban and rural distribution systems. Charts, curves, photographs and rating tables are given.

(25) **CIRCUIT BREAKERS**—A compact new bulletin designed to aid in the selection of molded-case circuit breakers and enclosures has been published by I-T-E Circuit Breaker Co., 1900 Hamilton St., Philadelphia 30, Pa. The pocket-size bulletin presents construction and performance features, ratings and details. Ask for bulletin No. 5004-1A.

KILL TWO BIRDS WITH ONE STONE—Fill out this coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after March 1

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

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*Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

QO® —THE FINEST BREAKER EVER BUILT!

QWIK OPEN

Conventional overcurrent protectors provide overload and short circuit protection for branch wiring, but they don't open fast enough to protect smaller extensions from repeated arcing or "flash" shorts. Such shorts—which can be caused by frayed cord, a fork in a toaster, a screw falling on a bus—consist of relatively low values and often produce spectacular flashes. Square D's **QO** breaker opens *instantly* with the first flash. No known protection is faster.

Remember—only **QO** gives you quick-make, quick-break switching plus full flash protection on all branch circuits. This added protection costs no more—why settle for less?

DEMONSTRATION PROVES IT!

Square D Field Engineers throughout the country are proving the superior performance of the **QO** breaker, using the demonstration kit shown above. It gives dramatic proof of positive protection against "flash" shorts. Make a "demonstration" date with your Square D Field Engineer.

NEW! ALL BREAKERS—EVEN TWO AND THREE POLES—HAVE SINGLE HANDLE —THE SAME AS IN THE MOST EXPENSIVE TYPES

GET THE COMPLETE STORY!..

Square D Company, Dept. SA-14
4335 Valley Blvd., Los Angeles 32, Calif.

Please send me
a copy of the 16-page **QO** Bulletin

Name

Company

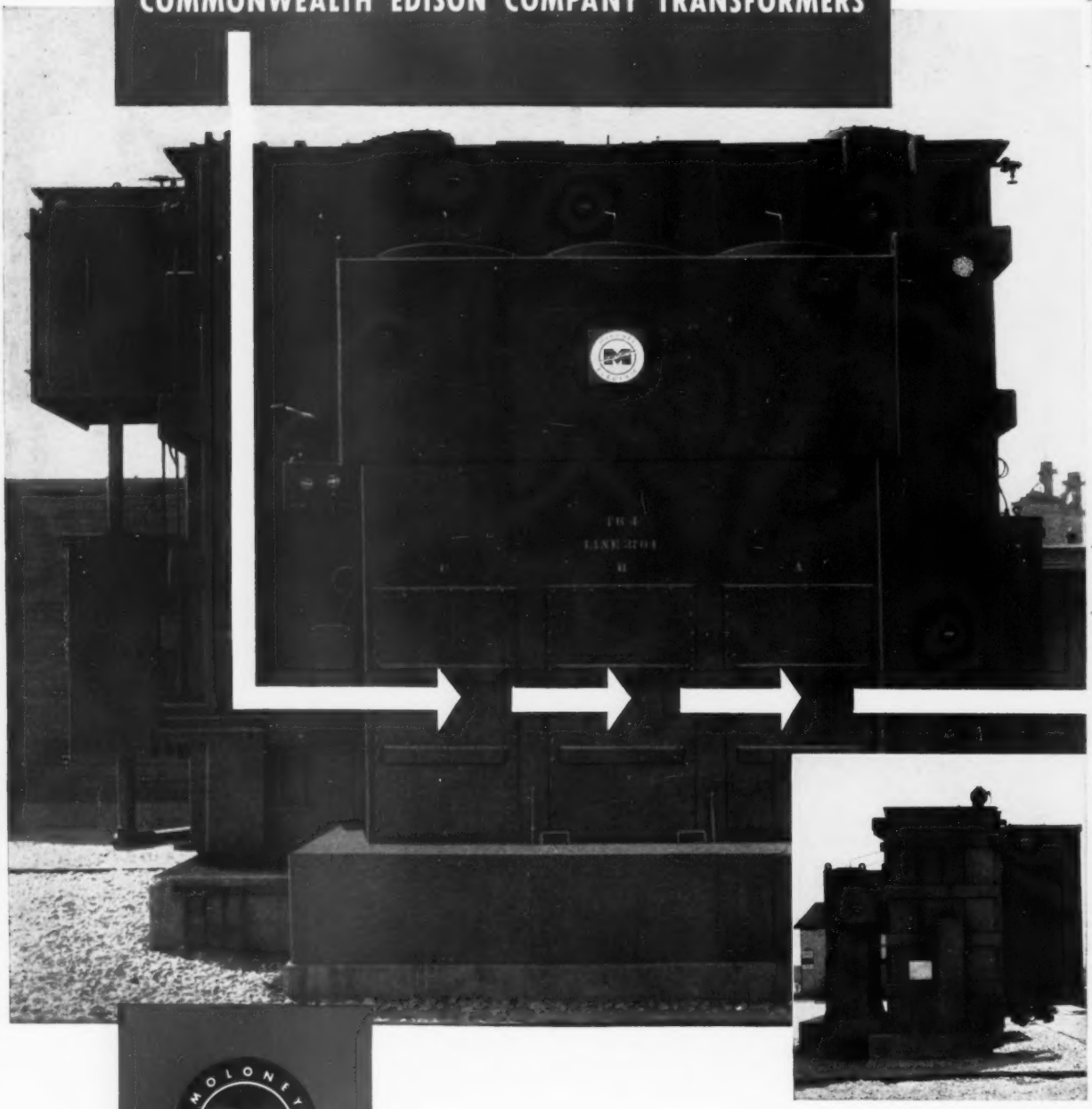
Address

City Zone State

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY

138 KV TERMINAL COMPARTMENTS TERMINATE HIGH PRESSURE PIPE TYPE CABLES ON COMMONWEALTH EDISON COMPANY TRANSFORMERS



MOLONEY ELECTRIC

Manufacturers of Transformers for Utilities, Industry,

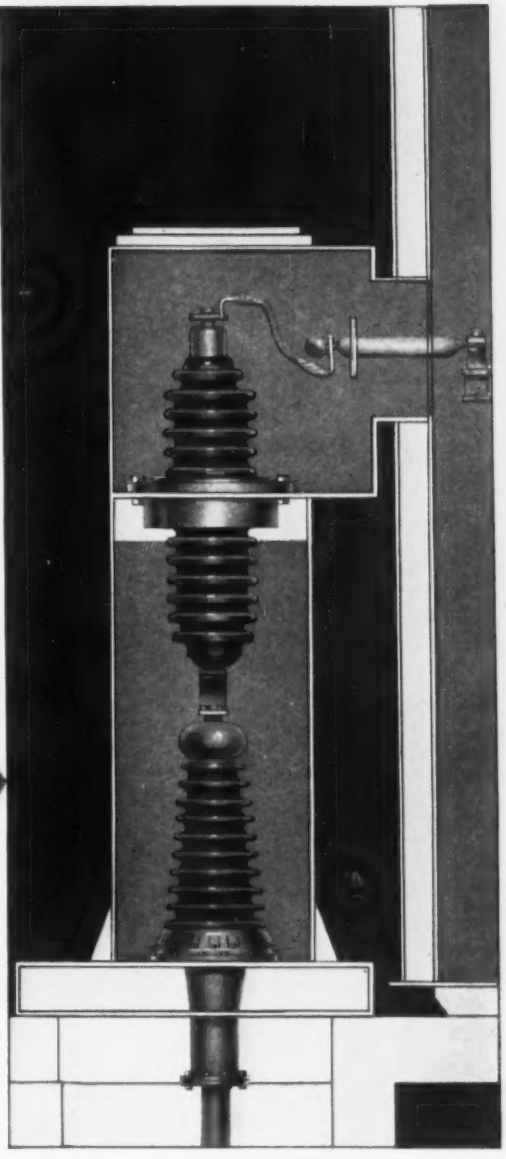
SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES

Provide Positive Isolation Of Cable Oil From Transformer In Event Of Cable Termination Leaks

To provide service in some areas of Chicago, Commonwealth Edison Company uses 138 KV lines, located underground, and therefore, 138 KV 200 PSI high-pressure, oil-filled cables are used.

Termination of a 138 KV line at a transformer presents the problem of preventing the cable oil from becoming mixed with the transformer oil in the event of a failure or a leak at the high voltage pothead termination. An effective solution to this problem is the two-compartment terminal chamber developed by Moloney in cooperation with Commonwealth Edison Company.

The upper compartment of the terminal chamber is attached to the transformer tank wall. Electrical connections from the transformer coils to barrier bushings installed in a partition between the upper and lower compartments of this terminal chamber are made through openings in the tank wall with transformer oil common to both the transformer tank and this upper terminal compartment. The lower compartment houses the high voltage potheads which are electrically connected to the lower terminals of the barrier bushings. This lower compartment is also filled with transformer oil and is equipped with a pressure relief vent, as well as a pressure-vacuum gauge and an oil level gauge having alarm contacts. Phase barriers are placed between the potheads.



In the case of even a slight leak of cable oil into the lower compartment, the pressure-vacuum gauge or the oil gauge will give indication of this condition and when the pressure or oil level reaches a predetermined point an alarm will be actuated. In event of an extremely bad leak the pressure relief vent will discharge excess oil.

Once again, Moloney, in cooperation with a customer, has developed a satisfactory answer to one of the day-to-day problems confronting the utilities.

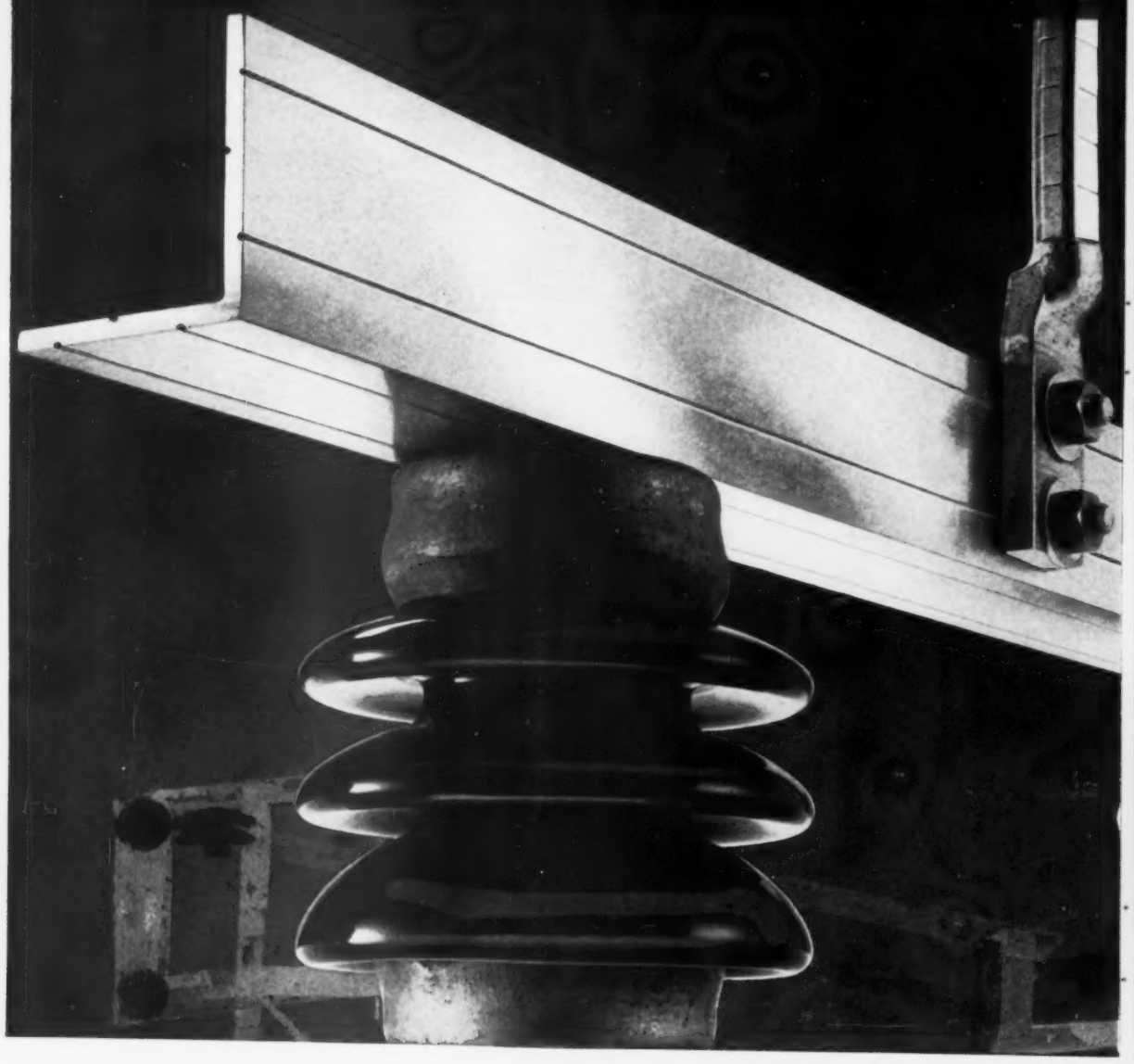
Whatever your transformer problem, contact your Moloney representative for the benefit of more than sixty years experience in solving problems related to the design, manufacture and application of transformers. MEBB 20

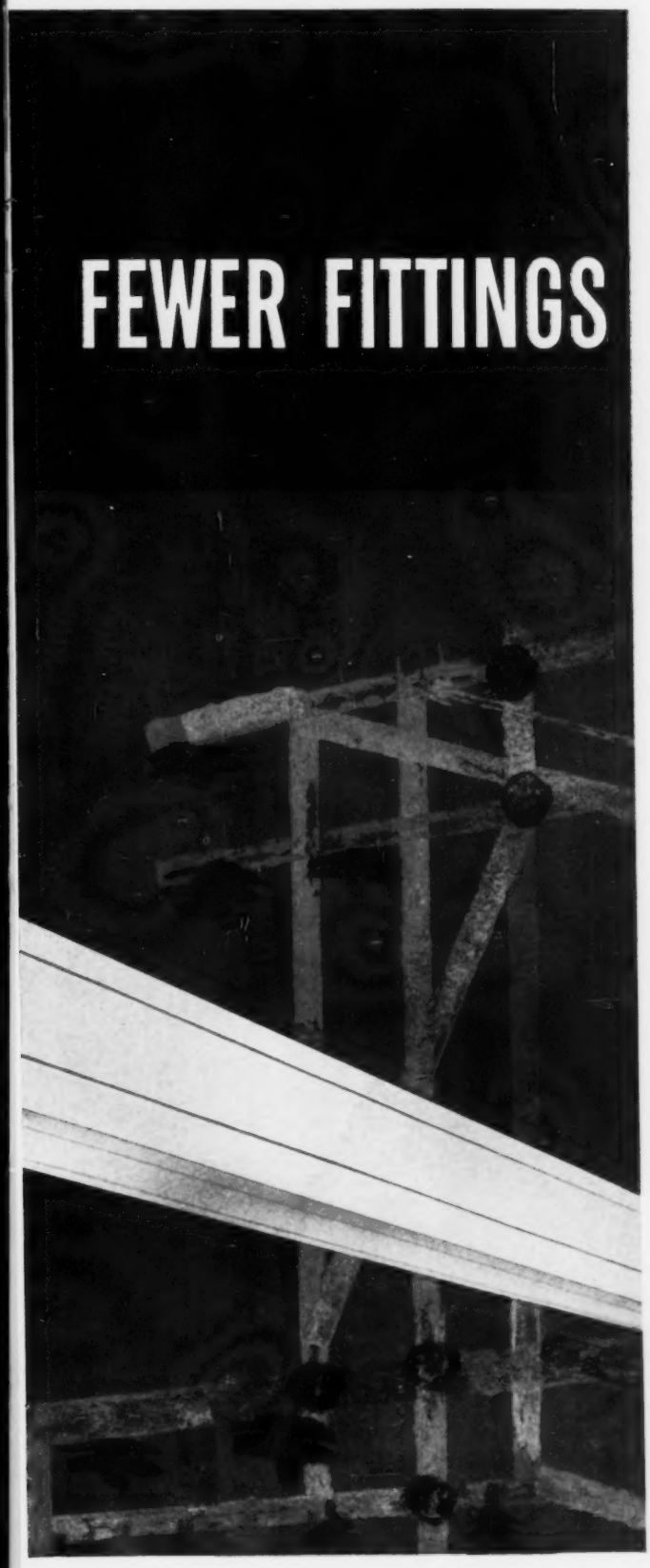
COMPANY

and Electronic Applications

AT ST. LOUIS 20, AND TORONTO, ONT., CANADA

ALCOA UABC UNIVERSAL ANGLE BUS CONDUCTOR
SPEEDS CONNECTIONS WITH





FEWER FITTINGS

NEW LOW-COST DESIGN FOR SMALLER SIZES OF SUBSTATION BUS CONDUCTOR ADAPTS TO NORMAL CABLE LUG CONNECTORS

Here is the latest development by Alcoa to help you save money. Universal Angle Bus Conductor —UABC.

This aluminum extruded L-shape provides a new low-cost type of bus conductor. Designed primarily for use in distribution-type substations, it can also be used advantageously in substations for subtransmission voltages and primary distribution voltages.

Alcoa® Aluminum UABC offers new convenience features that speed installation. Extruded grooves on the inside and outside of each leg locate the center points for drilling holes.

With Alcoa UABC, fewer and less expensive fittings are needed. Normally, the large number of fittings required cost more than the bus. In contrast, Alcoa UABC can be installed simply with bolts. Simple terminal connectors are used to make taps or flexible connections.

Years of Alcoa research and development, plus months of field testing, stand behind this new conductor. A good balance of mechanical, physical and electrical characteristics of this new conductor is incorporated by its shape and Alcoa No. 2 EC bus alloy.

Alcoa Universal Angle Bus Conductor is available *now* in the $3\frac{1}{4}$ x $3\frac{1}{4}$ x $\frac{1}{4}$-in. size in standard 25-ft lengths and is rated at 1,300 amperes. In most cases, the new conductor involves only one UABC per phase. For more information, call Alcoa today. Or write, Aluminum Company of America, 2112-A Alcoa Building, Pittsburgh 19, Pennsylvania.

Your Guide to the Best in Aluminum Value

ALCOA ALUMINUM

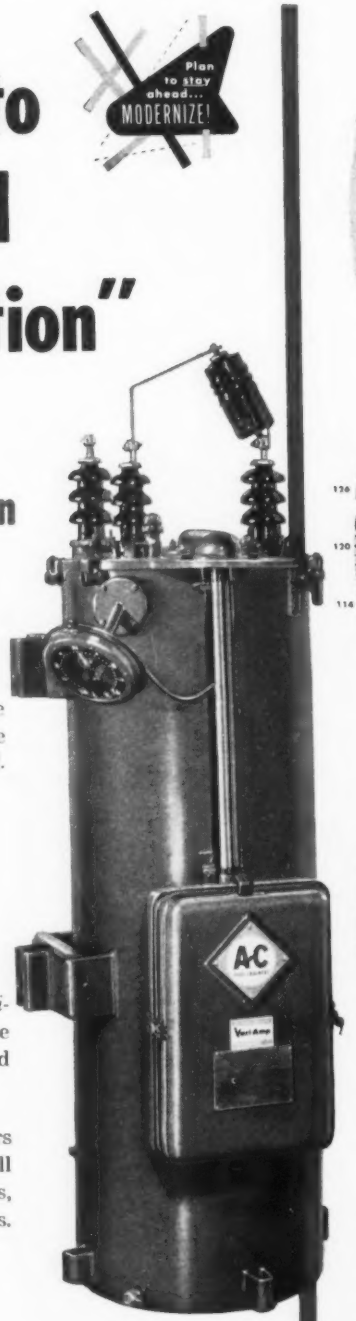
Watch "ALCOA THEATRE" Alternate Mondays NBC-TV
"ALCOA PRESENTS" Every Tuesday ABC-TV

ALLIS-CHALMERS — 25 years of 5/8% Regulator Leadership

4 steps to "Engineered Regulation"

Plan to stay ahead... MODERNIZE!

- cut revenue loss
- cut cost of regulation
- improve service



All power systems use regulation, but few realize the greatest possible benefits. That is why the "engineered regulation" approach is recommended.

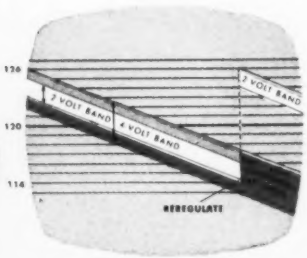
"Engineered regulation" means:

1. Use narrow 2-volt band widths.
2. Reregulate feeders.
3. Use lower cost 5/8% step regulators.
4. Utilize the complete potential of *Vari-Amp* and its short-circuit ratings so the smallest, lowest cost unit can be used at a given location.

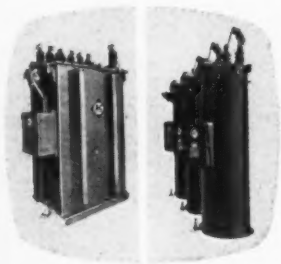
"Engineered regulation" is an art. Allis-Chalmers engineers can be of great assistance to you. Call your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.

Vari-Amp is an Allis-Chalmers trademark.

cut band width



reregulate



use low-cost units

use smaller ratings

Originators of 5/8% Step Regulators

ALLIS-CHALMERS

A-5859

Yes, you can save cable dollars when you go to higher voltages!

For 15 kv and up—consider Anaconda Durasheath rubber-insulated, neoprene-jacketed power cable! Its lighter weight, flexibility of installation, ease of splicing may mean lower installed costs!

With today's trend toward higher and higher voltages, better look into the advantages of Durasheath*—Anaconda's superior-quality rubber-insulated power cable. It may mean big over-all cost savings!

New Anaconda insulating compounds, improved shielding, and advances in cable manufacturing technique have now made it practical to extend Durasheath's voltage range beyond 15 kv . . . to 25 kv . . . and to even higher voltages.

In lower and medium voltage ranges (600 volts to 15 kv), Durasheath has already earned an outstanding reputation for safety, dependability, long life—*and* money-saving versatility. For Durasheath can be installed overhead . . . in ducts . . . and underground, in continuous runs with minimum splices. Its flexibility and light weight are important, too, in cutting the costs of supporting structures.

Now, Anaconda's proven "know-how" in cable construction has made it possible to bring all these advantages to *high-voltage* Durasheath cable! If you're "going up" to higher voltages, see the Man from Anaconda about Durasheath. He will be glad to help you work out your particular problem. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York. *Trademark

8887REV.

ANACONDA DURASHEATH ALL-PURPOSE POWER CABLE

Available in all sizes, single and multiple conductor, copper or aluminum, 600 to 15,000 volts and higher.

INSULATION. Type RHW, Anaconda ANW, AHW or AB rubber compounds, each designed for specific purposes.

JACKET. Specially compounded neoprene with high resistance to flame, oil, acids, alkalies, sunlight and ozone, high tensile strength and flexibility at extremes of temperatures. Densheath (PVC) and Polyethylene jackets are available for special applications.

SEE THE MAN FROM

ANACONDA®

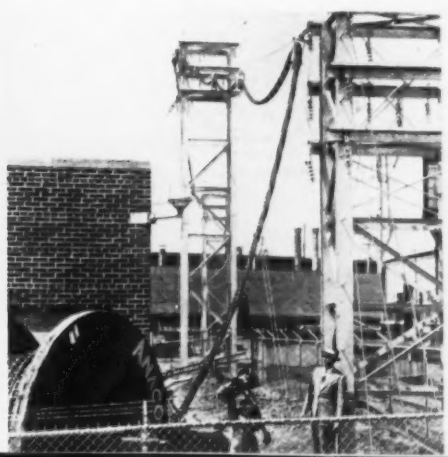
FOR **DURASHEATH CABLE**

FASTEST WESTERN SERVICE—At Orange, California, Anaconda's expanded, modernized mill fabricates and stocks copper and aluminum wire and cable for every type of application. Anaconda assures the fastest possible service on all West Coast needs. See Anaconda Sales Offices: Los Angeles, San Francisco, Seattle, Denver.

Anaconda Durasheath is 3 cables in 1, because . . . it can be installed—

IN DUCTS

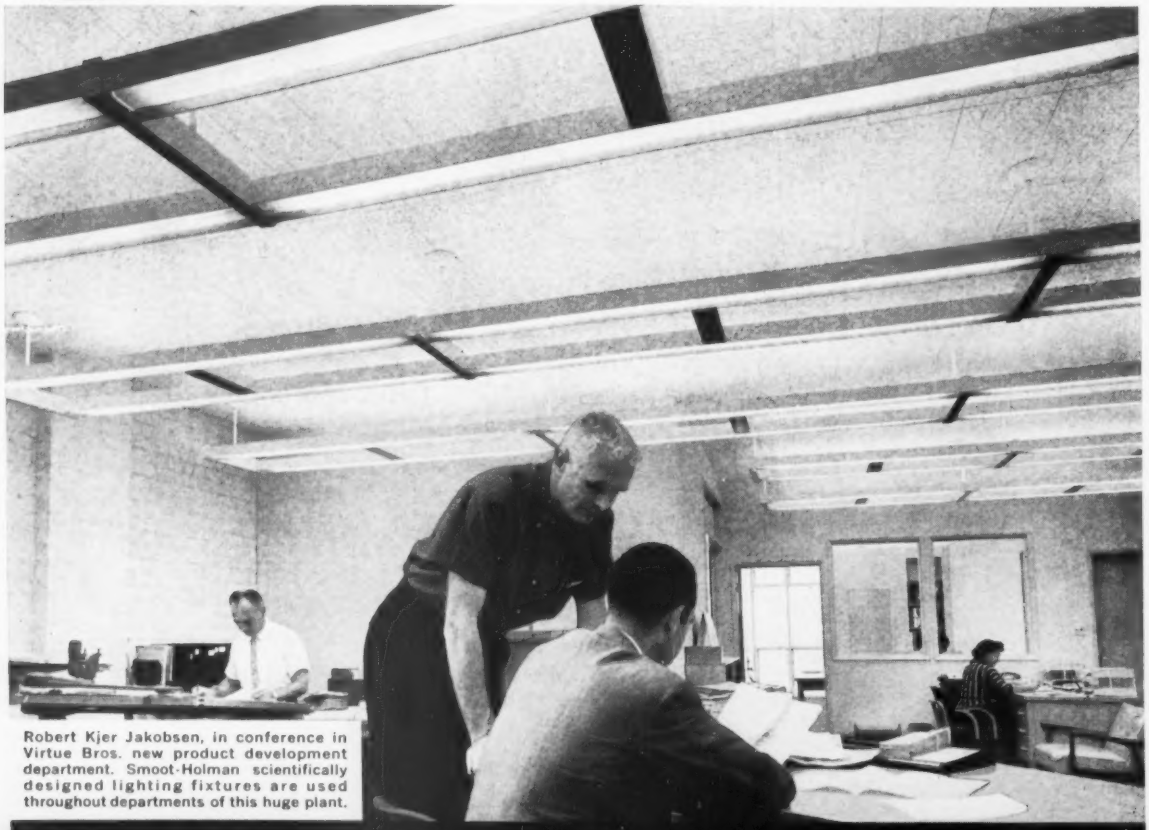
AERIALLY



UNDERGROUND

Virtue BROTHERS OF CALIFORNIA

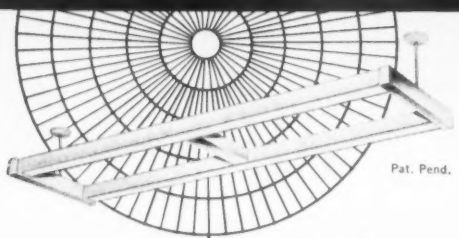
world's largest manufacturer of metal dining furniture, chooses Smoot-Holman lighting fixtures for true scientific lighting!



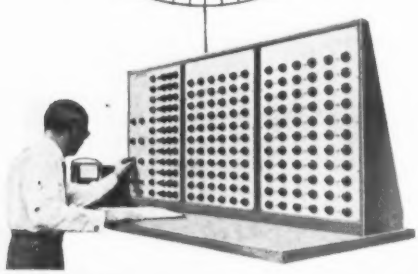
Robert Kjer Jakobsen, in conference in Virtue Bros. new product development department. Smoot-Holman scientifically designed lighting fixtures are used throughout departments of this huge plant.

scientifically designed **SMOOT-HOLMAN** lighting brings you

"TOMORROW'S LIGHTING TODAY"



Pat. Pend.



Smoot-Holman's advance design analogue computer. Used to achieve superior lighting design and unsurpassed lighting performance!

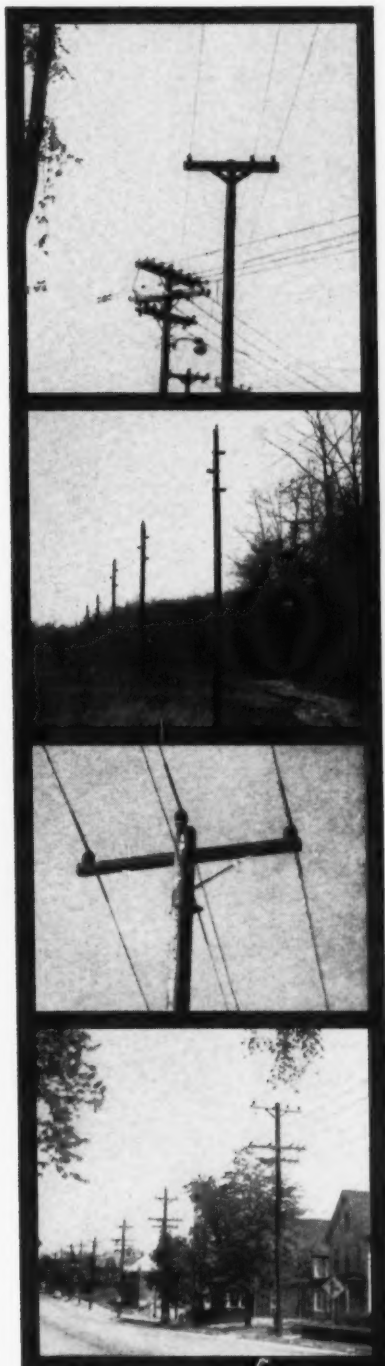
Robert Kjer Jakobsen, Chief Designer at Virtue Bros. Mfg. Co., has this to say about SMOOT-HOLMAN Lighting: "We're using Smoot-Holman Perfect Vision Luminaires in many areas in our office and plant because we feel they provide excellent light with no glare or sharp shadows. Before deciding on Smoot-Holman lighting fixtures we made a survey of a number of lighting installations and came to the conclusion that the Perfect Vision unit was the ideal one from many angles.

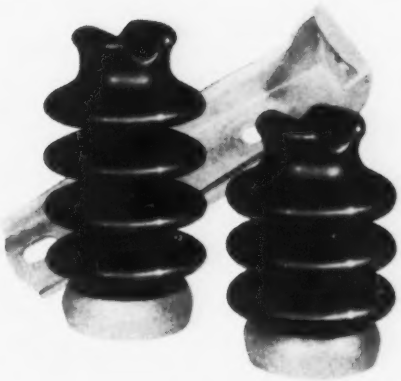
"In making our decision we took into consideration a number of things. Of first importance was to get a good lighting job ... which the Perfect Vision Luminaires give. Other important advantages we found in the Perfect Vision Fixture were ease of installation and maintenance. With maintenance labor costs what they are, we have to consider not only the initial cost of fixtures but maintenance as well. We have found that the Smoot-Holman Perfect Vision Fixture meets all our requirements perfectly."

SMOOT-HOLMAN CO.

Inglewood, California

TOMORROW'S LIGHTING TODAY!





LAPP DISTRIBUTION POSTS

Line Post reliability for distribution lines up to 27 kv

No distribution line you can build will serve as dependably, save as much sleep for your maintenance crews, or build as much customer good-will, as the one you put on Lapp Distribution Posts. These trim-appearing "junior Line Posts" just won't puncture . . . their solid one-piece porcelain body separates conductor from ground for its full length. Won't crack either . . . the only metal-to-porcelain joint is at the base; loading of porcelain is only in large-area, low-intensity compression. Greatly more resistance to flashover and impact, too . . . has short super-sturdy petticoats, with extra protection against failure in the fact that when petticoats are broken away, the post body remains intact with almost its full insulating values. Completely free of radio- or TV-interference at any operating voltage. Fog-type for superior performance in dust or atmospheric contamination.

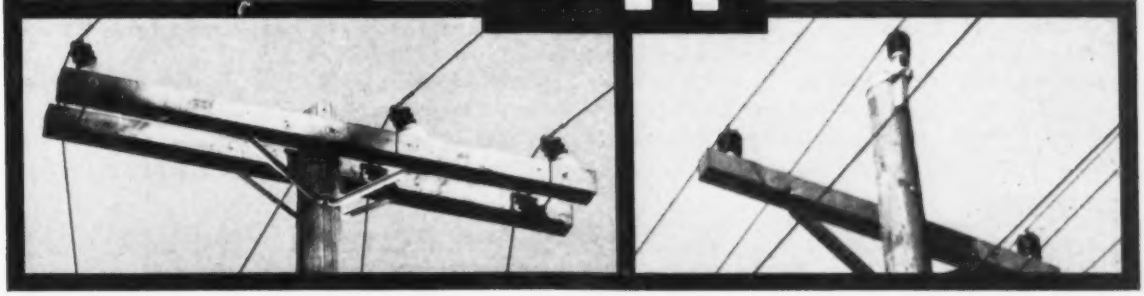
Where else can you get so much for so little cost? Better look into it.

Lapp Insulator Co., Inc., Le Roy, New York.

Lapp

WESTERN REPRESENTATIVES:

Los Angeles: Earl S. Condon Co.
San Francisco: C. E. Ingalls & Sons
Seattle: Charles F. James
Butte: R. E. McDonough Co.
Salt Lake City: Riter Engineering Co.



Electrical maintenance made easier with 3-way STABreaker Flexibility

STABreaker for AB-I's

STABreaker for Bus Duct Plug-ins

STABreaker for Lighting and Power Panelboards

With STABreaker, one inventory is all you need to meet all your circuit breaker requirements... whether it's for AB-I's, for Power and Lighting Panelboards or as Bus Duct Plug-ins. The only "plug-in" type AB breaker that can be used interchangeably in all three applications—STABreaker saves you time and effort... provides greater freedom than ever before in changing ratings and systems (from single-phase to three-phase)... reduces inventory...simplifies installation. Immediate "over-the-counter" STABreaker availability from your local distributor. AB-I's from 15 through 400 amps in only two standard enclosures. Lighting and power panelboards up to 600 amp mains, 400 amp branches in only four enclosures. Bus Duct Plug-in ratings from 15 through 100 amps. Write for detailed Bulletins 1-155 and 1-160: Federal Pacific Electric Company, General Offices: Newark 1, New Jersey.

FPE

FEDERAL PACIFIC ELECTRIC COMPANY

The Best in Electrical Distribution and Control Equipment.

How General Electric Power Groove Lamps helped
Chicago's State Street win back the title of...

THE BRIGHTEST STREET IN THE WORLD!

These unique "tree-like" poles have individual radio receivers that pick up the control signal for turning lighting on and off; each has 4 luminaires with forced-air cooling for best performance, one horizontal for making sidewalks brighter, safer, pleasanter.

"WHITEWAY" LIGHTING took on a new look when, for the first time, a radio-controlled switch turned on the new G-E Power Groove fluorescent system on Chicago's State Street last November. With a maintained light level of 14 footcandles, this 7 block stretch is now the world's brightest. This is about 10 times the illumination level recommended as adequate for lighting main business streets, 75% more than the next highest street lighting level now in use.

The approved design of poles and fixtures provides a system that is functional as well as unusual and artistic. And they represent more than 2 years of planning on the part of the State Street Lighting Assn., in cooperation with Commonwealth Edison Company.

WHY G-E POWER GROOVE LAMPS WERE CHOSEN. General Electric Power Groove Lamps deliver nearly twice the light of any previous fluorescent the same length. This means you get more light from fewer lamps, fewer fixtures. And you save from 5-20% in original cost compared to other types of fluorescents.

Maintenance costs are lower, too, because there are fewer parts to take care of. Power Grooves deliver good roadway visibility—especially on wet pavement . . . and their special moisture-proof coating makes them ideal for street lighting applications. For more information on street lighting with G-E Power Grooves, write: General Electric Co., Large Lamp Dept. C-902, Nela Park, Cleveland 12, Ohio.

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6% of General Electric's distribution-transformer sales goes to improve the product and reduce costs to you

Research in distribution transformers is a catalyst which speeds the normal rate of developments. To make innovations fast enough to keep pace with the unprecedented growth forecast for utilities, General Electric invests over three times as much, per sales dollar, as the average for all industry.

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411-80

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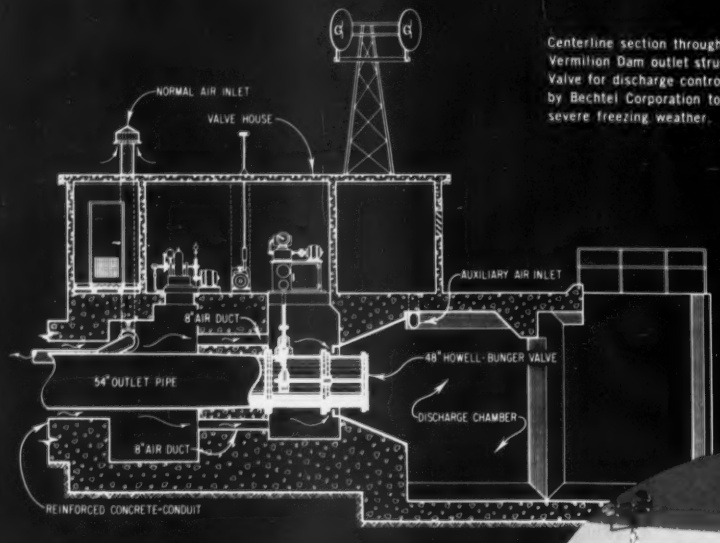
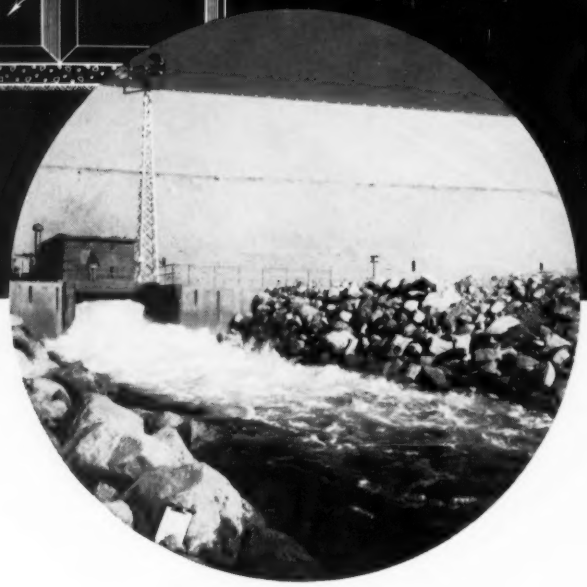
		G.E.	OTHER MFRS.			
MEASURE LOAD BUILDING—do Co.'s other products build load? Does Co. sponsor load-building programs?						
CHECK SERVICE—24-hour shipment? repair and uprating? emergency assistance?						
COMPARE FEATURES—how many exclusive features in terms of longer life; reliability; easy maintenance?						
ANALYZE PRICE—does Co. hold line against inflation with significant product developments?						
EVALUATE INNOVATIONS—has Co.'s research paid off for you? Recent examples?						

FILL IN THE BLANKS . . . See which manufacturer gives you more for your transformer dollar: Mark "X" for a measurable contribution, "O" for insignificant contribution.



Centerline section through Southern California Edison Company's Vermilion Dam outlet structure shows 48-inch SMS Howell-Bunger Valve for discharge control. It is mounted in a chamber designed by Bechtel Corporation to minimize spray, erosion, and icing in severe freezing weather.

Valve discharging approximately 800 cfs at full gate has caused no noticeable erosion to channel in three years operation. Southern California Edison Company's Vermilion Dam and reservoir is on Mono Creek in the Sierra Nevada of California. At the Company's Portal Powerhouse on Huntington Lake, Calif., a 90-inch SMS Howell-Bunger Valve also operates under severe winter conditions by remote control.



Remote Controlled SMS Howell-Bunger Valve at Vermilion Dam Provides ***EASY REGULATION OF FREE DISCHARGE***

A 48-inch SMS Howell-Bunger Valve was chosen for Vermilion Dam to provide close, accurate regulation of releases from 10 cfs to 700 cfs. Remote control was necessary because of the isolated location of the site, and dependable operation and minimum maintenance were required, even in 20 below zero winter weather. Since late in 1954, this Howell-Bunger Valve has operated successfully under all conditions.

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ELECTRA'S HUSBAND

Food for Thought

THE round table at the club was settling down to coffee, cigarettes and conversation. Hank, who likes to kick off a controversial subject, flicked his Zippo and remarked: "I see we are getting no place fast in engineering education. Did you note the figures that enrollment in engineering colleges this fall was down nearly 8% over last year?"

"Are you trying to spoil my lunch?" grumbled another of the group. "It doesn't seem as though all this publicity and activity, such as Engineers Week, is getting through to the youngsters. Or maybe it's just that engineering seems too tough a way to get a college education for these little pantywaists that we are raising today."

"Well it's a pretty bad situation, I admit," remarked Bill, who had been particularly active in the education field. "However, if you want something that will really spoil your lunch you ought to read the report of Fred Lindvall's mission to Russia to observe engineering education in the USSR."

"I saw that report," I said, turning to my guest from the East. "Dr. Lindvall, who is chairman of the Division of Engineering at California Institute of Technology, just got back from a mission that was sponsored by the American Society for Engineering Education. He and seven other prominent engineering educators visited 25 teaching and research institutions in Russia. I gather they were pretty much impressed with the way that the Russians are tackling their problem of producing the professional people needed for their master plan."

"I can remember a few of the salient points," added Bill, "but the big thing apparently is the quality of the instruction and the seriousness of purpose that is evident among the students in the classroom and laboratory. The students themselves seem to have a genuine respect for intellectual achievements and even haze the laggard student."

"Yes," I agreed. "I seem to remember the figure that 90% of those who gained admission to the college level (and it's pretty tough competition to get in, too) complete their requirements for a diploma. That's quite a contrast to our school system where the freshman engineering attrition rate is somewhere in the neighborhood of 30 to 40%."

"Another thing," added Bill. "The Soviet plan calls for graduating 350,000 professionally trained people per year and, in the engineering field, the proposed increase over the past seven years is 90%."

"That sounds a bit foreboding," said Hank. "It might even be real scary if the quality of their graduates is anywhere near good."

"Oh, but it is, but it's geared to a little different objective than our educational system. I seem to recall that the report said that professional people were educated in a narrow field of specialization right from the time they enter college. In other words, the student has to choose his life's work very early in the game and practically commits himself to that particular phase of industry for his whole career. The state plans ahead and estimates the number of people it will have to have in each category and sets up the admission system based on these anticipated future requirements."

"That's right," said Bill. "I seem to remember that engineering is divided into about 160 separate specialities. Over here the great majority of our students are included in about five major fields and there are only 20 accredited fields in the whole country."

"Another thing," I added, "the Soviet professional curriculum is 5 to 5½ years of both theoretical and practical work but there's a real incentive for the student to get his diploma."

"From our standpoint," mentioned my guest, "this does not seem to be very reassuring, particularly if this country is going to have to meet the population growth and the higher standards of living that our economists predict for the next 10 or 15 years. What's the answer anyway?"

Bill was anxious to answer that one. "Oh, there are lots of answers. We have to make intellectual achievement as attractive to teenagers as a varsity letter or social prestige. We somehow have to get over the idea that every youngster is not entitled to a high school diploma just for sitting four years in class. We have to somehow instill in doting parents the idea that teachers who can illuminate the mind are just as important as lighting fixtures which can illuminate all these new classrooms that we're building like crazy across the country. Oh, there are plenty of answers but the question is how to get them."

"Amen, said Hank. "Now that the subject of education has been broached and my digestion completely ruined, I'd like to contribute my two cents' worth." He pulled a clipping from the morning paper out of his pocket. "Here's a little tidbit about a survey made by some of the more aggressive members of our board of education among the companies who have to employ the high school graduates of this fair city. It's disgraceful. Girl graduates who can't be put to work filing because they don't know the alphabet. Boys who have to be given a refresher course in fractions before they can be put to work by the union in an apprenticeship course. Students who can't fill out an employment application form correctly because they don't know how to read."

"Well," I added, "we're not going to get the answers by sitting here all afternoon. It seems to me that one of the best New Year's resolutions that all of us could make would be to pledge a little more of our time during 1959 to getting something done about this problem of education. Writing and speaking won't get the job done. What we need are some doers."

When I reached home that afternoon and started to take my tie off and get into slacks and a sport shirt to take it easy, Electra stopped me. "Just a minute," she said. "Have you forgotten that PTA Fathers' meeting tonight?" "Oh, for Pete's sake, do I have to go waste the night at that yak fest! I'm not going," I protested.

"You'd better," she retorted. "Aren't you always *talking* about engineering education. You need more engineers, remember? Better start with a few fathers of boys and get them working with you."

editorial views

New Dress

AS you've probably noticed, Electrical West has started out the new year with a full-color cover. This view of offshore cable laying is the first of a series of dramatic full-color photographs depicting electrical progress in the 11 Western states. For the business press generally, it is an innovation made possible only by new technologies in the printing process.

The publication takes this method of highlighting the spectacular growth of the Western region. It is also another step that the editors have taken to give the Western region the modern, progressive type of industry publication it deserves. They solicit suggestions as to future subjects for cover photographs. Better yet, they would like to review any color film transparencies of outstanding electrical information which might fit into the full-color series that are planned for the future.

Price—Who's Got the Dice

PRICE should be a mathematical total of such costs as labor, materials, supervision, design, taxes and fees, office procedures, utilities, transportation, etc., and, if the business is to survive, profit — which is interest on the money it takes to operate. The only gamble that is legitimate is over the matter of "contingencies," the unexpected delays of weather or circumstances. Logically that item should be high, rather than low, to provide a decent factor of safety.

But pricing today is anything but logical, mathematical or even sensible. It is wishful, plunging, dangerous, foolhardy—all the essentials of wild gambling, blind to consequences. Evidently it is so because a chance is taken that every supplier can be beaten down enough to break even. And the supplier in turn takes a gamble that his supplier can also be beaten down.

Something has to give, and it is quality, service, research or other valuable assets to all business. May 1959 bring back a realization of the need to maintain these qualities to preserve business itself.

Active Year Ahead

ALL who have read the interesting summary of 1959 business prospects on page 41 of this issue will agree that the coming year will be a busy one for everyone in the electrical industry. Opportunities for service there are in abundance. Over a quarter of a million new customers will come on the lines in the far West this year. The research laboratories and manufacturers are bringing out literally hundreds of new applications for electric service. More than 80% of the homes could stand a face-lifting in the form of modern wiring and electrical living. A whole new highly advanced standard of lighting intensities has to be sold. Large steps toward the economic utilization of atomic power will have to be made.

These and a host of other challenges are the things that make for progress. Licking the problems and overcoming the obstacles always opens new horizons for further service to the public and to the nation. The industry can be thankful that it has these almost unlimited opportunities for growth, expansion and progress.

Pioneering Still Goes On

IT is indeed gratifying to have three Western power companies selected out of the group of five that will compete for the Edison Award this year. Congratulations go to Pacific Gas & Electric Co. (for pioneering in privately financed atomic power developments), to Idaho Power Co. (for its pioneering efforts for private development of the Snake River), and to Arizona Public Service Co. for pioneering in computer applications for utility operations.

The Edison Award, formerly the Coffin Award, is made to the company that, in the opinion of the judges, made the most significant contribution of the year to public service that will benefit the public and the industry. A group of 39 industry leaders across the country nominates the companies that, in their opinion, should be considered for the award. Nominees are then screened by a committee, which selects five companies with the most noteworthy accomplishments. From these five, a final judging committee will select the Edison Award winner, the ceremony of presentation taking place at the annual EEI convention.

It is significant that out of all the utilities in the United States that three from West of the Rockies should come out on top. The West, which has a long list of "firsts" in connection with electric utility developments, still is pioneering to do a better job of service. Naturally, the entire electrical fraternity out here is hoping that the final winner will be one of our own group. And the odds are good!

Transit Cat Skinning

THE old adage states that there are many ways to skin a cat. Most major cities are struggling with the problems of automobiles vs rapid transit. The city of Seattle is no exception. Its municipal transit system is faced with increased operating costs and the need to replace a considerable amount of its present equipment—at a cost estimated to be about $8 million.

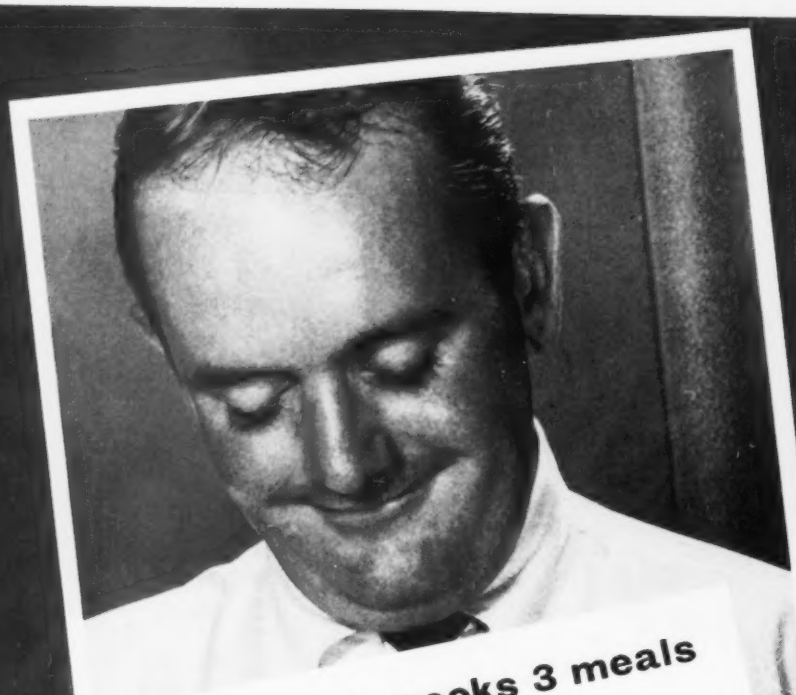
A recent article in the Oregon Voter described some of the ideas set forth by the city transit committee which would permit improved service without the fare increases that would still further price the transit system out of the market. In short, the city transit committee was talking about subsidies in many forms.

One idea was to assess property through the creation of transit taxing districts similar to local improvement district laws. Another thought was to consolidate the transit system with Seattle City Light, with the latter subsidizing or underwriting transit losses. Still more radical was an idea that the city add a one cent gasoline sales tax, a part of which would be used for a transit subsidy. Still others included a wheelage tax for private automobiles, an increased charge for parking meters and an excise tax on autos parked in garages and lots.

Some of these measures are both impractical and illegal but the idea of penalizing the single occupant automobile, largely responsible for declines in transit patronage and increase in traffic congestion, might have a popular appeal. As long as it's relatively easy and relatively inexpensive to drive to work, most people will shun the various forms of mass transportation. If mass transportation has to be subsidized, there may be a modicum of justice in having the people who are presently responsible for its loss of patronage and slowed-up operations pay a goodly share of the cost.

THE term "profitless prosperity" came into being because it describes a condition in which the distributor is doing a whale of a big business, handling a great volume of goods, but unfortunately not making any money. In fact, some distributors have pushed themselves right out of business by this high volume route. . . . One of the big difficulties or reasons for shrinking profits is a willingness to do business at any price. . . . Last year many wholesalers showed a profit of only a fraction of their sales — at a time when there is a fantastic amount of construction under way."

Abstracted from a talk by Carl S. Menger, executive vice-president, Triangle Conduit & Cable Co. Inc., before a group of Kansas City electrical distributors.



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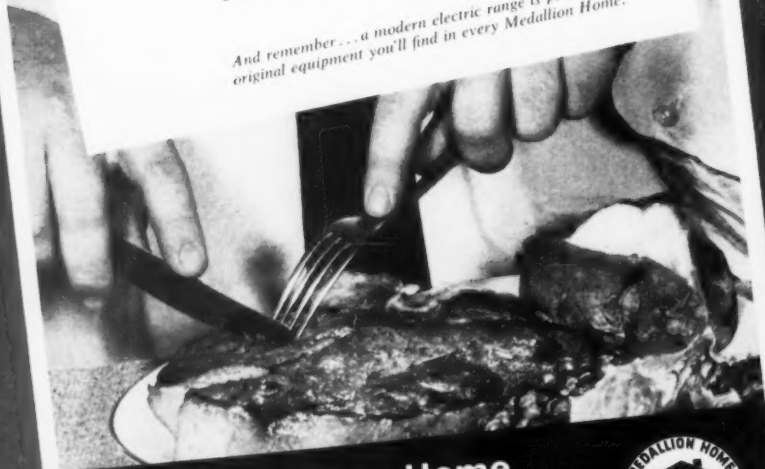

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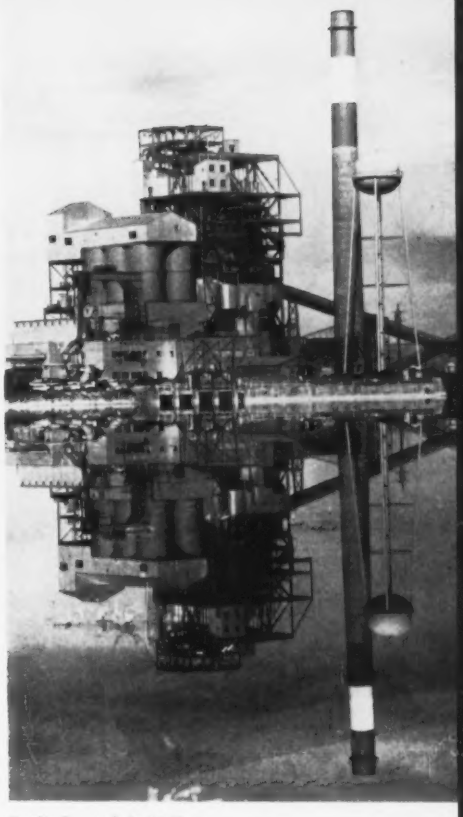
EDISON sells readers on the low cost of electric cooking . . . to help YOU sell more electric ranges

ELECTRICAL WEST

VOL. 122, NO. 1
JANUARY 1959

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

What's ahead in the New Year? To get the answers and predictions, Electrical West asked the members of its Editorial Advisory Board (see page 1) to pool their knowledge, experience and sagacity in a 1959 business forecast. This article is the essence of the opinions of these leaders in Western electrical operations. The editors, in expressing appreciation on behalf of the industry, recommend this fast-paced, informative peek at the probable shape of things to come.



Pacific Power & Light Photo

Reflections on '59

On General Business—The country's economy showed a decided resiliency to the recession experienced in 1958. The fast upswing of the last quarter of the latter year will continue through the next 12 months with the last quarter of 1959 approaching the record-breaking level set in 1957. But don't relax, political and economic currents will run strongly against the business man.

Spending for new construction is expected to pierce the $50 billion ceiling for the first time with a 7% rise in capital expenditure above the $48.8 billion spent in 1958. Privately financed projects in 1959 will contribute $35.2 billion to this total, a gain of $1.4 billion over last year. New residential construction, always a good barometer for the electrical industry, is expected to show an 11% advance, gaining from $18.5 billion to $20.6 billion.

The physical volume of sales for 1959, according to a McGraw-Hill survey of manufacturing industries, is expected to increase 9% in physical volume. This optimistic viewpoint of general business conditions has the concurrence of ELECTRICAL WEST's Editorial Advisory Board, the members of which predicted unanimously that the electrical business in the West would be better in 1959. Only two respondents indicated any hesitancy about predicting a growth in business volume of between 5% and 10%.

Preliminary returns from utilities on 1959 budgets indicate commitments that will be equal to or greater than those of 1958. EEI's President Jack Corette, who is also president of the Montana Power Co., predicted expenditures by U. S. electric companies are expected to equal the 1958 figure of $3.8 billion. Despite the recession, the total electrical production for the nation reached a new high of 721 billion kwh, although the percentage increase was less than 1%.

On the Political Front—The Democratic election sweep indicates that champions of public power and the REA cooperatives will be riding the heavy end of the political seesaw in the 86th Congress, which convenes this month. As a result, investor-owned electric utilities, according to the McGraw-Hill Washington Bureau, "may well face the most hostile legislative onslaught since the 1930s." Dominance by the big spenders and liberals on the legislative scene presages more inflation and less resistance to labor demands (see below). A liberal trend can be anticipated as labor prepares to collect its heavy political debt from the members of Congress it helped elect.

Again, all members of the EAB were unanimous in predicting a continuation of the inflationary spiral during 1959. They were divided, however, on the ability of the business-managed utilities to stave off a government-financed atomic power program.

"Strikes and labor turbulence are likely to increase in 1959, particularly if a recovery seems firm. Wage and fringe settlements are likely to exceed productivity improvements by a wider margin than in 1958, thus giving another thrust to cost-push wage inflation." This was the statement of Emerson P. Schmidt, director, economic research, for the U. S. Chamber of Commerce, in December. He also stated that the possibility of a steel strike next July will induce considerable steel inventory building, particularly in the second quarter—a fact that may give a false sense of boom. There is also considerable political talk of raising the legal minimum wage from $1 to $1.25 or $1.50. The Democrats could make political capital over such action.

Big problems will have to be faced by the new Congress. All eyes are on the 1960 election. Government costs are going up; there is very

". . . electrical contractors are going to have to face the hard facts that they are either going to have to get a fair price for their jobs or they are not going to remain in business . . ."

A consulting engineer member of Electrical West's Editorial Advisory Board

little possibility of a balanced budget—even with a spectacular rise in business. Unemployment, due to increases in the labor force, was still 1.3 million higher than it was a year earlier; American exports show every sign of being priced out of international competition, while imports are remaining relatively stable. This latter condition not only tends to drain gold reserves but increases the pressures for tariff protection, with their attendant implications in a troubled world. Probably many of the answers that will be proposed for these problems will not be popular with businessmen and particularly the investor-owned utilities.

On Construction—Wages will continue upward (between 4% and 7%). Construction will be more costly, trained manpower will be in shorter supply, and the "Profitless Prosperity" era for both distributor and contractor will continue without much change as "volume" still has the nod over "margin." More fringe benefits will be sought, and union political activity will be directed toward higher minimum wages, a shorter work week, higher unemployment compensation and generally greater security for the union member and his family.

Considering the variety of fields from which the EAB members come, there was a surprising unanimity of opinion as to several of the questions regarding 1959's electrical construction. Union ingenuity, according to the Board, is reaching new highs in conceiving fringe benefits. Examples include a paid holiday for the worker's birthday, premium pay at double time instead of time and a half, longevity pay, a six-hour day for eight hours' pay, etc., etc., etc.

There was somewhat divided opinion as to the availability of trained manpower, but those Board members who felt that it was in short supply were quite vociferous in commenting on the lack of training and the hurdles placed in the way of adequate apprentice training programs. For example, one utility man said: "Recruitment to those training programs gives the appearance of being limited to assure that no surplus of journeymen exists."

Just about all agreed that prices would go higher in 1959, but none of the Board foresaw that high wages and higher construction costs would defer new construction. "There does not appear to be any considered effort to resist price and wage increases by curtailing plans for new work," said one consulting engineer. Another pointed out that the fact that the electrical contract is only 6% to 10% of the total cost of the average building deters any real resistance to the upward spiral.

There will be no precipitous changes in technological improvements that would cut installation costs, either. Gradual mechanization will come about but, as one contractor put it, "Organized labor will go to any length to fight all tools that represent a saving in labor."

Cut-throat competition in electrical construction bidding apparently will continue through 1959 and beyond. There seems to be no particular solution to the problem with the possible exception of a bid depository system. The fact that the Department of Justice now would condone such a system (if run strictly and ethically) may revive support for this method of correcting the worst abuses of bidding, i.e. bid shopping and bid peddling. All agreed, however, that the best that could be expected during the coming year would be merely a start toward a solution.

On the Equipment Market — The market for electrical equipment this year will be slightly better, dollarwise, in the West than it was in 1958. Its context, however, may shift with the mix being more heavily seasoned with transmission and distribution items than generating facilities. The recession-born breathing spell in demand and output has tempered the pace for the production facilities. Foreign competition is on the rise. Prices will be firmer.

Nationally, utility equipment expenditures are expected to remain at around the $5 billion annual rate. The prospects of continued capital investment by industry indicate a moderate growth in volume for industrial electrical equipment such as motors, controls, heating units and similar items.

In answering the question whether prices in general will firm up during 1959, opinion of the EAB was split down the middle. From this it can be gathered that pencil sharpening will be popular during 1959, although as the year opened there were indications that prices had firmed up in several areas.

Answers to the survey clearly indicated that the utility industry's support of standardization will increase. The reason for the increased support of standards repeatedly is given as the answer to ever-increasing costs. However, there were also comments that standards must be quick to change if the equipment is to keep pace with the needs of this fast-growing electrical industry.

Seen through the eyes of the Editorial Advisory Board, the influence of foreign competition will be greater, rather than smaller, in 1959, although most feel that this growth will still be confined to government and municipal agencies. Despite repeated effort on the part of industry leaders to obtain protection for the heavy electrical equipment produced in the U. S., orders still continue to be placed overseas. One Board member commented hopefully that labor would bring pressure to bear for higher tariffs. Since no effective tariff protection has been forthcoming in the automotive industry, it would appear problematical whether labor in the electrical industry would be able or willing to identify foreign labor rather than domestic management as its real adversary in the coming year.

Another area of general agreement proved to be the continuation of the boom-or-bust cycle as a way of life in the electric utility market. Various reasons were set forth to explain this phenomenon, but there appeared very little hope that the industry could achieve a uniform buying pace and maintain it over any given period of time. Most comments put the blame on the white sale and other pricing policies of the manufacturers themselves, which is another way of saying that price shopping has replaced "book" in the minds of many buyers.

Manufacturers and distributors can expect to continue to maintain a greater inventory burden in 1959 as the price of getting business. EAB

members pretty well agreed that users' inventories will be kept down in the foreseeable future, and some pointed out that in the distribution field, the stocking function is one of the measures of service now entering into the buying decision. According to one or two Board members, this concept is not an unmixed blessing in that the stocking function has been given a recognizable value in the eyes of the buyer to the end that availability and service, rather than price, are enhanced in the minds of the purchaser. Whatever inventory increases do occur (and they will be slight) will result from an overstringent purchasing policy that actually has handicapped the user.

On Engineering Trends—The Editorial Advisory Board members were emphatic in their conclusion that increased technical efficiency of utility systems would not be able to offset the inflation that faces the industry, now and in future years. In fact, no real revolutionary engineering development leading to cost saving was mentioned as being on the horizon.

Also negative was the answer to the question: "Are there any broad fundamental studies aimed at attaining economies in capital and operating costs in the area of distribution?" These two negative answers raise the question as to whether the industry believes that distribution costs are at rock-bottom today, or whether the entire subject yet awaits exploration.

The Board believes that there will be moderately increased difficulty in obtaining technical manpower during 1959, and that the market for really top-flight engineers and managers will be as tight as it ever was. Another point brought out by the survey was the fact that respondents generally concurred that future expansions would make increased use of the consulting engineer. However, in almost every case, it was suggested that the consulting engineering firms would be utilized on a specific need basis in a manner where they could best supplement the existing capability rather than on a broad project basis, which was typical of the postwar years. In this connection, it may be noted that the services of the consulting firms are being used increasingly by the utility industry for specific studies, such as loadbuilding, office arrangements, administrative procedures, etc.

On Loadbuilding – Appliance sales will pick up in 1959, with substantial increases expected over the depressed 1958 market. Stability of personal income and the prospects for a good housing year were cited as the reasons why.

Housing, incidentally, will depend to some extent on whether or not a new bill to ease housing credit is passed by Congress early in the year. An economy-minded President vetoed the $3 billion bill which was passed by the 85th Congress.

More effective selling, especially seasonal selling, is seen as the key to improving the industry's loadbuilding efforts. One spokesman suggested that attempts to coordinate advertising between utilities and distributors, concentrating on one appliance at a time would be beneficial. He believes that if such a program could be carried out for even one or two appliances, some time during the year it would have a large impact on sales. Another thinks that electric sales promotion on a national basis needs vast improvement. A step in this direction is now being taken through the new EEI program (see the following pages).

Insofar as selling methods are concerned ". . . don't expect a miracle in 1959" is the consensus regarding the solution to such troublesome issues as fair trade, warranties, profit margin and servicing costs. Most of the Board members saw a gradual improvement in these matters. Discount houses, for example, are cited as probably having reached their ultimate place in the West's appliance business. These outlets have dropped the policy of using fictitious brand names and are now advertising well-known merchandise, a move which brings them closer into competition with department stores and major dealers. One Board member noted "a marked trend" to eliminate the distributor by factory controlled sales to dealers. On the other hand, most believe that manufacturers and distributors were taking decisive steps to strengthen their market position, which should improve the dealer situation during 1959.

The majority commenting on the loadbuilding picture believe that the electric companies are successfully resisting the inroads of gas competition, but one member stated that the electrical industry is still on the defensive with regard to gas and cannot successfully hold its position unless it takes the offensive. In this regard, house heating and air conditioning are seen as the most promising single load for exploitation as well as striking at the heart of the gas competition. The heat pump was named specifically as the best single item in areas where climatic conditions favor it or where water heater saturation is high. A more detailed description of the 1959 promotional programs is included hereafter.

Basic Problems – Asked to nominate the number one problem which confronts the industry in the forthcoming year, the greatest concern of the EAB seems to be the after effects of a continuation of bidding abuses and price cutting that have characterized 1958 operations. A close second in importance appears to be the drift toward socialism and the public indifference to the implications of that course. Third on the list, apparently as a result of dwindling hydroelectric resources, was the problem of securing long range fuel supplies for thermal generation, including nuclear power.

The year 1959, as summarized by the comments of these Western electric industry leaders, can be a good year for everyone. Although each apparently is optimistic about his own business prospects, the survey uncovers a deep, underlying concern over the basic foundation upon which this prosperity rests. There is an implied mandate for greater anticipation by the members of the industry in civic affairs and for a stronger collective expression of resistance to the unethical, the unfair, the uneconomic and unscrupulous pressures which expediency often condones. With a watchful eye to the future, they are wishing the industry a Happy and Prosperous New Year.

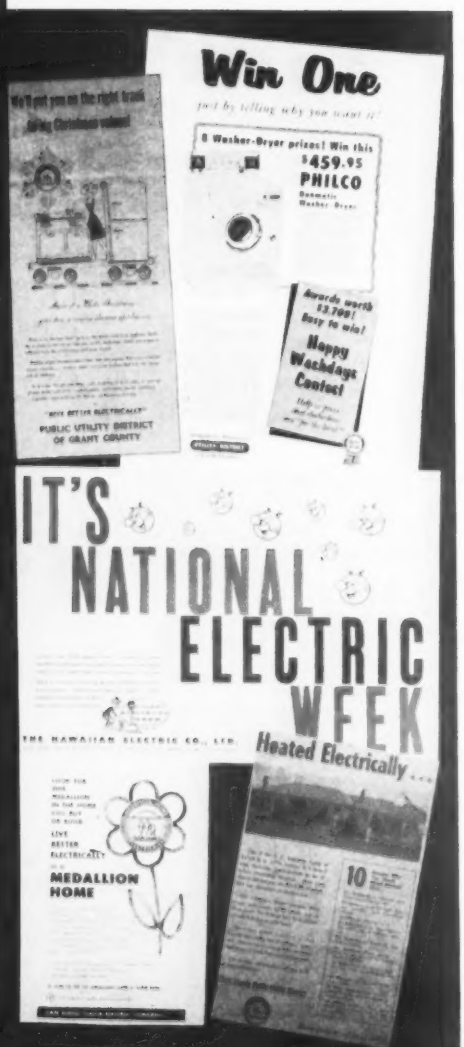
". . . the electrical industry may be maintaining a competitive position with other industries volume-wise but not dollar-wise . . . intra-industry competition has kept appliance prices proportionately lower than other products . . ."

An association executive member of Electrical West's Editorial Advisory Board

When you see this GOLD MEDALLION on a new home
you'll find ELECTRIC HEAT
IDAHO POWER
ON CALL
DAY AND NIGHT
LIVE BETTER Electrically
CALIFORNIA-PACIFIC UTILITIES COMPANY
YOUR PARTNER IN WESTERN PROGRESS
the days are growing shorter
This Gold Medallion Takes the Confusion Out of
Tomorrow's Planning for

Advance reports from Western utility executives indicate that

Promotion Budgets Will Climb



A promotion-minded industry will step up its load-building activities again in '59, judging by advance reports from utility commercial executives in the Western states, Hawaii and British Columbia. The early December deadline for Electrical West's survey finds plans in the making, budgets not yet approved but the intention of the majority to spend more dollars on promotion this year is clearly evident.

Survey returns were received from 54 utilities, serving some 93% of the West's electrical customers. Private and public agencies and all sections of the West are represented. Here are a few of the highlights:

Promotional Dollar Volume

Forty-four executives willing to commit themselves on tentative promotional budgets for 1959 plan to spend a total of $13,618,526, more than $2.26 per meter. This is a conservative figure, in many cases confined to such costs as advertising space, printing, materials and art work. Where salaries and other sales promotion costs were added, the amount per meter was much higher.

The major part of the West's tentative promotion budget – $11,085,139—will be spent by 11 utilities, averaging $2.43 per meter.

Of 18 firms giving dollar figures for both years, a group of eight intends to increase its spending over 1958 by $1,148,398.

Those who stated their spending in per cent of gross revenue will put about 3% into promotion. One company who spent 2.6% of gross in 1958 plans to up its expenditures about 10% in '59.

Media

Newspaper advertising continues to be the backbone of most advertising programs, although radio and TV are being used extensively. Spot announcements on newscasts and weather reports will take the lead on radio and TV again in 1959. Twelve utilities reporting, however, will sponsor network shows or a program of their own.

Outdoor advertising on billboards and trucks will be used to tie in with specific promotions, for institutional advertising or to promote area development by about one-third of the respondents. Use of spectacular cutouts in addition to poster boards is indicated by some.

Service companies and agencies will also tell their story through direct mail, newsletters, co-op papers, farm journals, builder publications, lobby displays, informational booklets, personal contact. Oregon utilities are planning to take active part in the coming Centennial.

The majority will cooperate to some extent in national promotional efforts. At the close of its first year, the Medallion Home program is way out in front, with 66% of the answering utilities planning to continue it actively in 1959.

Although it is too early for a complete roundup on planned participation in the new EEI program (see p 47) about half the respondents

Utility advertising last year carried the all-electric story throughout the West

Again in '59

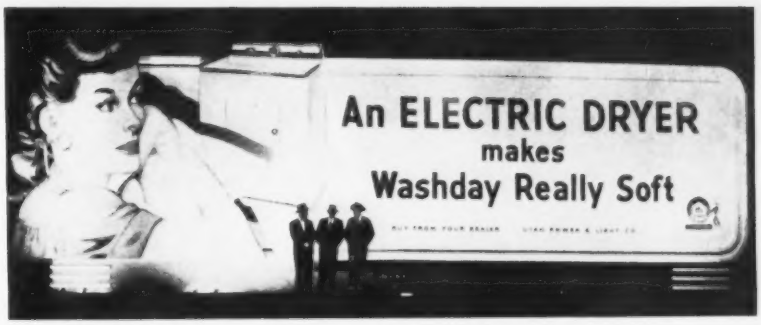
said they were cooperating fully or in part.

Model homes, fairs and expositions, traveling shows and exhibits are all popular. In addition utilities are using effectively such promotions as exchange of new for old light globes and electric cords; free range and water heater installations; time pay wiring; dealer appliance sales allowances; cooking schools; training programs.

Belying the contention that electric heat is being neglected promotionwise, this service took its position with lighting right under the Medallion Home on the list of planned promotions. Ranges, dryers, water heaters, freezers, air conditioners, commercial cooking are all popular items. Six respondents specifically mentioned industrial promotions and area development was put on several lists.

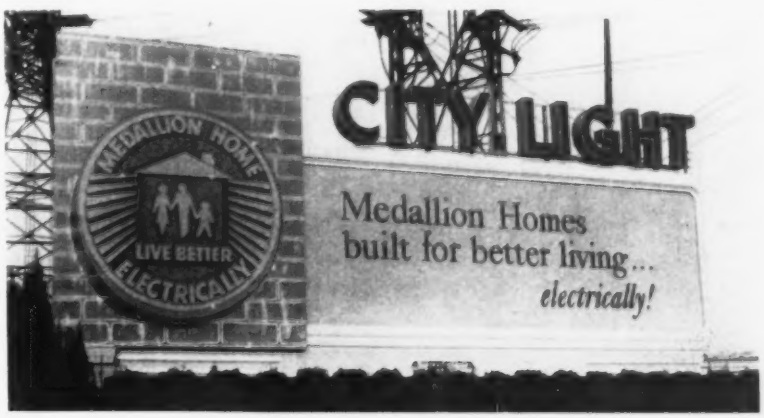
A marked tendency is shown to step up contractor-dealer programs and to try for greater cooperation from residential electric contractors. One company will hold small workshops and develop incentive programs for contractors. It will also develop revised Medallion standards in an illustrated educational-type brochure.

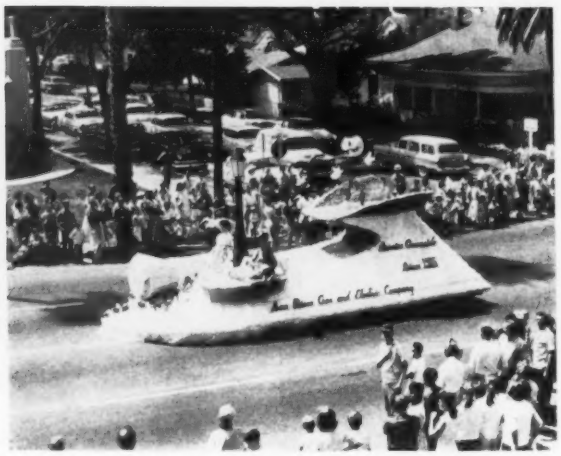
While only a few of 1959's promotion plans can be highlighted here, there is ample evidence that the utilities of the West, working in cooperation with industry allies, often through leagues and associations, are going to tell more and more people how to live better electrically.



Outdoor signs and car cards emphasized the ease . . .

. . . economy and comfort of living better electrically



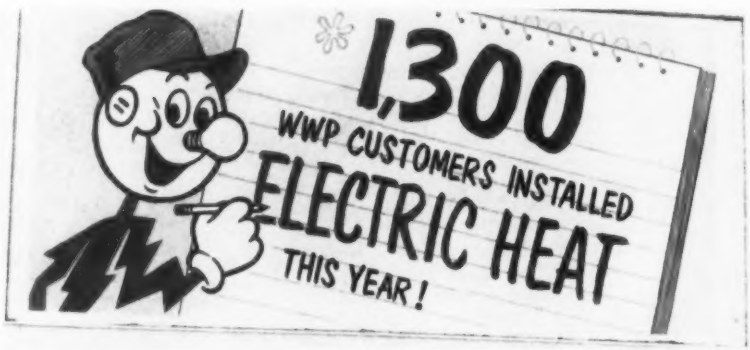


Active participation in community affairs will be on every utility program again in 1959

GLAD you came in today
LIVE BETTER ELECTRICALLY
Maybe you are an old friend,
or you're visiting us for the first time.
We're glad you stopped in.
We hope your visit will be pleasant.
We want to offer you every courtesy.
Your
DEPARTMENT OF PUBLIC UTILITIES

m-mm-mmm wonderful
ELECTRIC HEAT
for head-to-toes comfort
THERE'S NO NICER DE-ICER
Than Modern Electric Heat
Live Better — Electricity is cheap in California
P·G·E· Pacific Gas and Electric Company

Electric heat was out in front in '58 advertising, will play an important role in 1959 utility loadbuilding plans



Information booklets, the Medallion Home program, institutional ads were all good-will builders

EEI Program—A National Umbrella

A powerful all-electric living program being launched in 1959 by the Edison Electric Institute will put $3 million to work selling more appliances, wiring and lighting. According to John Mead, vice-president of Southern California Edison Co., who with Don Willis, vice-president of Arizona Public Service Co., represents the West on the EEI administering committee for this program, $2.5 million has already been pledged by member companies. It will be used in national magazines, on TV and in point-of-sale materials.

Designed as a long-range program to focus more attention on the tremendous benefits electricity brings to modern living as compared with other forms of energy and fuel, the promotion is beamed at both new and existing homes.

In drawing up the program, which includes the entire industry, the chance to work together with a common purpose and plan was put side by side with an opportunity for more sales and greater profits for everyone.

A continuous flow of hard-hitting sales messages will drive home the idea that the only modern way to live is electrically, then will provide an action program to make it easy for customers to learn where and how to buy electric living.

It is emphasized that the EEI program is a national leadership effort to aid aggressive *local* promotions. Basic in the plan is the interweaving of the current Medallion Home program and Live Better Electrically. Here are its three parts.

I—Appliance, Medallion Home

This selling phase, the first of the 1959 push, is designed to meet these goals:

1. Create all-electric "climate" in the customer's mind
2. Sell the electrical advantages of electric products
3. Establish basic selling events throughout the year so the industry and its customers can take advantage of natural buying trends
4. Create a program attractive enough to bring about industry-wide cooperation and support on a large scale
5. Build a flexible, yet practical, platform for better coordinated local action

This phase will be supported by four big buying events: All-Electric Value Time (all-electric living), February-March; All-Electric Kitchen Carnival, April-May; All-Electric Laundry Festival, September-October; All-Electric Gift Parade, November-December.

II—Housepower

This phase will continue the mass education of homeowners on the need for and benefits of more wiring and, like the appliance program, will create a flexible framework for local tie-in. It will provide training and other aids to make it easy for individual contractors to develop and expand local Housepower programs. Kickoff will be during National Electrical Week.

A spring promotion will be built around page ads in *Look*, with a reader test on Housepower based on the Photo-Quiz idea. The ad will end with a message directing the reader to his Housepower specialist, the electrical contractor. A fall promotion will run in *Life*, with an editorial type layout showing a "house full of new ideas to help you live better with full housepower."

III—Lighting

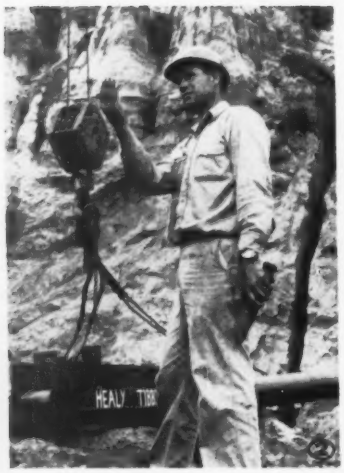
The Light for Living Program is keyed to (1) student architects; (2) adult consumers; (3) high school teenagers, future homeowners.

Phase 1—Student architects in accredited schools will be encouraged to draw up plans for a complete new home for a family of four, cost not to exceed $20,000 and size to be between 1,150 and 1,250 sq ft. The U. S. will be divided into regions for the contest, and entries will be judged on practical lighting design using fixtures and outlets now on the market.

Phase 2—Participating members of EEI will be given top award plans for use in cooperative builder programs for model Light for Living Medallion Homes. Target date for opening these homes will be the fall of 1959 following National Home Week.

Concurrently EEI will announce an adult consumer contest to build a desire for better home lighting and to bring local traffic into Light for Living homes. Contestants will be asked to complete sentences in a multiple choice quiz.

Phase 3—Early in 1960 high school students will be asked to obtain entry forms and a lighting booklet from their lighting dealer, check the lighting in their own homes and the homes of two neighbors or friends, then write an essay, ad, radio or TV commercial selling lighting for some specific room.



1. Shore-end terminal of the cable was in metal-clad fuse gear. Southern California Edison Co. dead-end shows lightning arresters for cable surge protection.
2. Trench from the metal-clad gear leads down the hill toward the beach, where specially fabricated plow is positioned prior to pulling the cable ashore.
3. The barge is anchored by tugs, while a cat with a line pulls the cable ashore.

Searching for offshore oil . . .

Power Goes to Sea

In the world-wide scurry for energy sources, geologists feel that the last great U. S. find may be off the coast of southern California. Even with the growing mass of evidence that there is offshore oil, the only way to be sure—and to cash in—is to sink a well.

Standard Oil Co. of California, in a joint venture with Humble Oil & Refining Co., will be taking this risk at a site 2.2 miles off the coast near Santa Barbara, Calif. The $2,000,000 rig will be all-electric, providing for electric power drilling as well as pumping if the well proves out. From the single platform, Standard, as the operator in the venture, will be able to drill as many as 25 wells radiating underground in all directions.

In years past, oil men have leaned heavily toward engine power, ever fearful of electric spark and possible fire. In recent years, the great utility of electricity, and an excellent safety record, has caused a swing away from the high maintenance engine powered equipment. Even with an all-electric rig, there is a strong temptation to use diesel generators for the power source.

Southern California Edison Co.'s firm 17-kv power was as close as the shoreline, so it seemed reasonable to study submarine cable as a means of doing away with the obvious maintenance required by engine generators. This was an important consideration since Standard hoped that the rig could be unmanned and re-

6. The plowing proceeds into the surf. A diver follows the plow to make certain that rocks don't damage the cable. No difficulties were experienced.

7. The plowing-in completed a safe distance (500 ft) to sea, the plow's cable rider is lifted free and the cable removed. Preparations were made for sea.

4. The cable is set in the channel on the plow and a heavy rider placed on top, so that the cable will flow out at the bottom of the trailing edge. The cable is secured at the base of the cliff to prevent the plowing from pulling the cable in the trench.

5. As the winch on the barge pulls the plow into the ocean, the cable is buried to a depth of about two feet.

motely controlled as soon as all wells were completed.

The 3,500-kva cable installed will be more than adequate for the 1,000-kw anticipated peak drilling load. The pumping load will vary from 100-500 kw, depending on the recovery method selected. With good fortune, the power cable may become one terminus of a loop connecting several similar platforms working the offshore pools.

The cable itself is of considerable technical interest. Rated at 16.5 kv, it is believed that it is the first submarine cable in this voltage class using a polyethylene compound as primary insulation. Even the lemon yellow (see cover) polyethylene sheathing has two unusual functions. The color was selected to aid in relocation, as well as to facilitate the diver's inspection of the plowing-in operation. This outer sheath, while in no way associated with the primary insulation, will serve to insulate the armor and reduce the size of the cathodic protection equipment used with the parallel rig-to-shore oil pipes. The cable, 13,700 ft long, was manufactured in a single section by the Okonite Co. so as to avoid the complications that go with splicing.

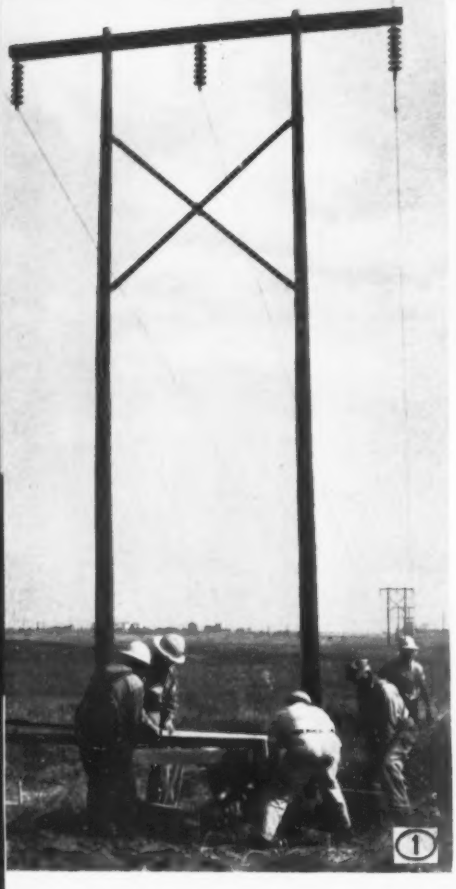
Initially, it was planned to use a microwave link for communications and remote control of the rig. With the underground power cable plan, it became economically possible to build in three pairs of control leads, thus simplifying the communication problem. Standard carrier protective equipment will isolate the communication pairs in the event of a short to the power leads.

The decision to use submarine cable was made a year ago, January 1958. The installation shown took place in August. On Nov. 25 the first well came in, two months, five days after drilling began.

The extent and final yield of the offshore fields are yet to be assessed, but the initial strike begins to make the $7,250,000 lease payment and the $2,000,000 investment in the rig look less speculative. The electrical industry, with more than a casual interest in our oil reserves, is proud of its part in offshore oil.

8. With the shore end plowed in, tugs take over, pulling the barge toward the platform. The cable barge is then anchored off the rig and the remaining cable is unreeled in figure eights on deck.

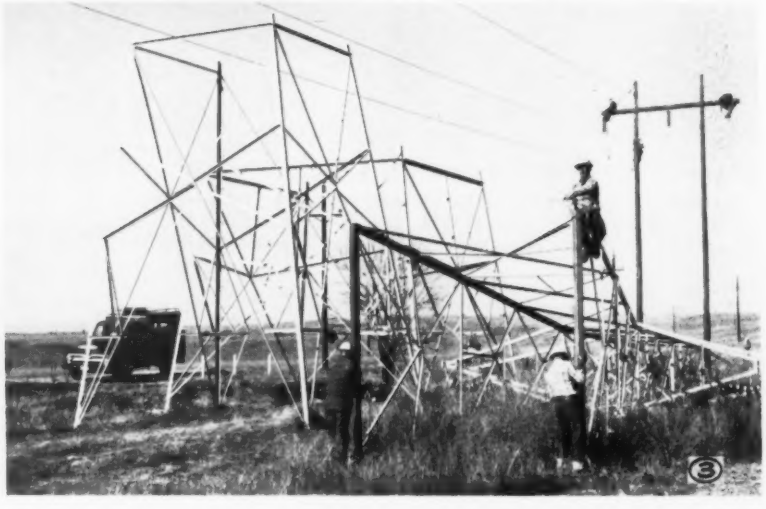
9. A pulling line is fed under the construction and cable-laying barges and used to pull the rig end of the cable up into the rig's terminal.



1. Assembling stub angles to the setting templates prior to pouring concrete.

2. Checking the elevation and batter on the stub angles. All dimensions must be within one-quarter inch.

3. This view shows the wires being placed in the hooks lashed to the H-frame poles. After the crossarm is removed, the wires may be picked out of the hooks by the crane without a man on the poles. This tower is assembled in three sections.



PS of Colorado replaces 115-kv H-frame line by . . .

Overbuilding With Towers

G. C. Farnsworth, Transmission Engineer, Public Service Co. of Colorado

The 115-kv, single-circuit Denver Belt line encircling the city of Denver, Colo., was built during the material-short war years. It was of wood pole H-frame construction on a 75-ft right-of-way. Wartime restrictions allowed only a minimum conductor size. The growth of Denver and attendant steam generating plant expansions demanded not only larger conductor but more lines. A new right-of-way now would be extremely costly so the most economical method of doing the job was to replace the H-frame with a double circuit steel tower line on the old right-of-way.

A recheck of the old profile was made to bring it up to date. Towers were located in the usual manner to determine the number and heights needed. Towers were ordered with a request that the stub angles that go in the concrete footings be shipped first.

Stub Angles Set in Advance

When they arrived, a short boom auger formed the foundation holes and flared the bottoms. The stub angles were suspended in the holes from steel setting templates. Two engineers were on the job continuously to set and keep the stub angles at the correct elevation, batter and location until the holes were filled with concrete. All measurements were held within one-quarter inch to insure easy erection of the tower. This method of footing installation eliminated a large amount of grillage steel and much back filling and tamping or puddling labor.

The steel tower was then hauled to the sites and assembled. The first section, depending on its height and the line clearance, was usually erected on the footings. The rest of the tower was then assembled lying down, complete with arms and insulators. The taller towers and the heavy corner towers were assembled in three sections, the lower one permanently placed on the footings and the other two sections beside the footings. All of the work to this point was done by ground crews with the line hot.

A crane with a long boom (105

ft in this case) was the key to rapid tower setting and transferring of the wires to the new towers. They are available from large moving companies. A set of padded hooks were made, which could be clamped to the poles of the H-frame below the crossarm. The conductors and ground wires were removed from the suspension clamps and placed in the hooks and the crossarm loosened. As the crane came by, it lifted off the crossarm. Meanwhile, bracing timbers were lashed to the bottom of the tower section lying on the ground and lifting harness attached to the top. The proper size and number of bolts for each joint were placed in "nose bags" and attached to the tower legs. The crane then picked up the tower section, set it in place to be bolted on by workmen standing on temporary steps clamped to the leg angles.

While the bolts are being tightened, an open "snatch block" set in a specially made grab hook is attached to the crane line. With this tackle, the conductors and ground wires can be picked up and lifted to their new positions on the tower. The installation of armor rods and suspension clamps and attaching to the insulator strings are done from the conventional tower ladder.

A line truck, equipped with a small earth auger and hydraulic boom then pulls the H-frame poles and cleans up the site. A 13-man crew normally sets three tangent towers per day, transfers the wires and has the line back in service for the evening peak.

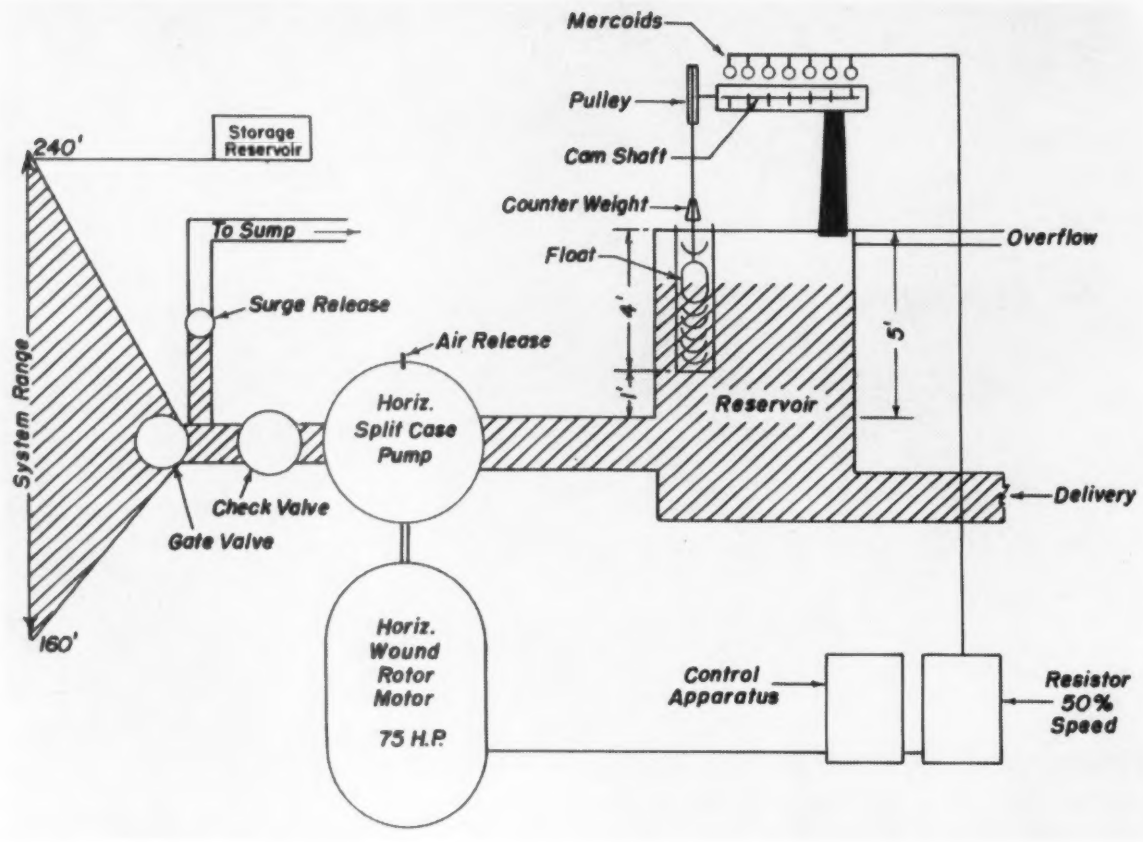
4. **The top section of the tower, with insulators attached, goes into place. The "nose bags" at the bottom of each vertical member contain the bolts for each joint.**

5. **The crane picks up the wires and raises them to the lineman on the tower ladder. The men in the center of the tower finish tightening the tower bolts.**

6. **The line truck pulls the H-frame poles, completing the transition to towers.**

While the line is dead-ended at line angle points, the lower section of the tower is built up around the poles. The wires are snubbed off to the tower base while the poles are pulled and the top sections of the tower hoisted into place. The wire is then raised to the arms positions and dead-ended in the usual way.

If the conductor had to be increased, only the overhead ground wires were attached permanently. The wire stringing is a separate operation. The old conductor was placed in dollies and used as a pulling line to pull in the new conductor. A tension stringer proved to be very useful in this type of operation.



New Job for Variable Speed Drive

Ray Humphrey, California Electric Power Co.

While variable speed electric drive is certainly not new to the electrical industry, the pumping plant recently installed for the city of Rialto presented some rather interesting problems, both electrically and hydraulically.

The solution to these problems and subsequent installation of equipment proved that the plant's operation could be effected more efficiently and economically with electric drive. The operating conditions required by the city of Rialto water system were unusual in this case for several reasons.

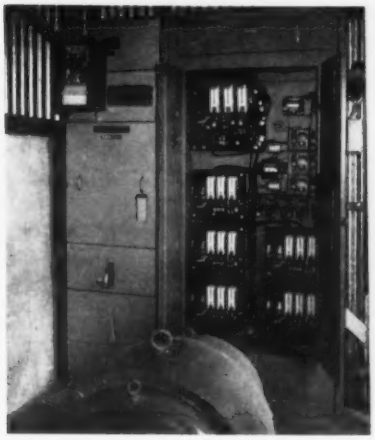
- Water had to be purchased, to meet demands, from a private water company in varying amounts between 450 gpm and 900 gpm. Once a capacity was requested by the city a constant delivery would have to be maintained for several hours.
- Limited space prevented the construction of a storage reservoir of sufficient capacity to utilize one or several constant speed units.
- The requested capacity would be pumped into the city's water system against varying pressure heads of between 160 ft and 240 ft, depending on system demands. Excess water could flow to the main reservoir located several miles away.

Where To Use It

Sewage pumping.....Fire pumps
Circulation of industrial slurries
Make-up water for cooling towers
Fuel handling.....Most pumping

- An emergency requirement of 1,500 gpm against a low fire hydrant pressure was desired.
- The plant was to be established in a residential area requiring a minimum of noise and vibration.
- In considering a constant speed pump an automatic regulating device on the discharge of the pump was eliminated as impractical since at low capacity and low system head the pressure imposed on the pump would be extremely high. Even when the flow was 900 gpm and the system pressure was at 160 ft of head the pump would have 240 ft of head imposed to maintain a constant flow resulting in lost operating efficiency.

With the assistance of factory representatives of motors and pump manufacturers, the following equipment was selected:



Control components are in compact housing

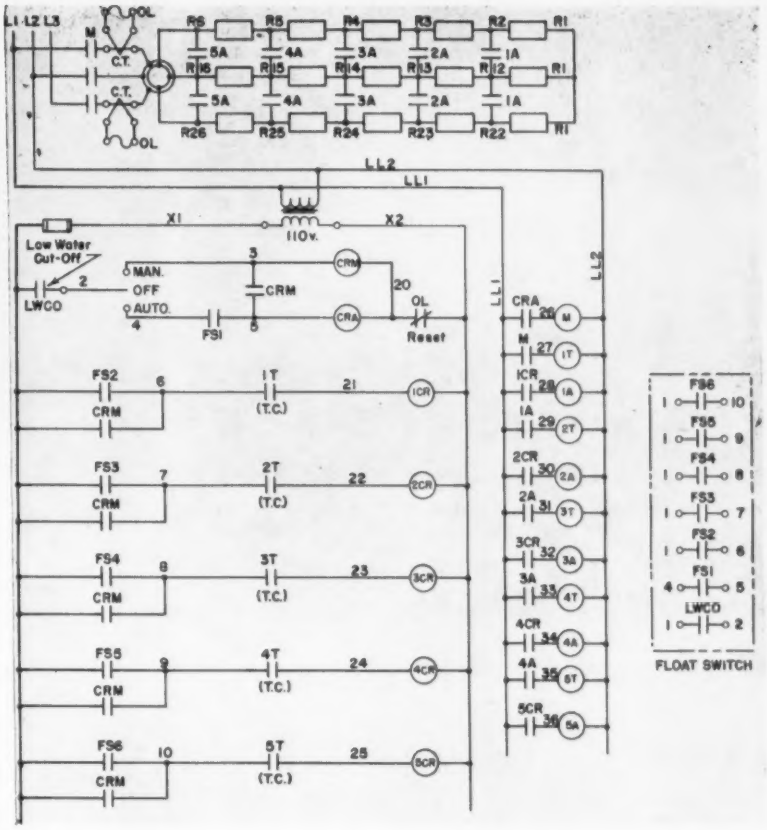


Fig. 1

1. A horizontal, split case, centrifugal pump designed to perform the most efficiently delivering 900 gpm against a pressure head of 240 ft. It was determined prior to the selection of the pump that the plant would operate the majority of the time under these conditions.

2. A 75 hp, 1,800 rpm, open drip-proof, horizontal, wound rotor, slip ring, 440 v, three phase, 60 cycle motor.

3. A float control consisting of a counter-weighted float suspended on a pulley. The pulley connected to an adjustable cam shaft when rotated operates seven mercoid switches, one for the low water cutoff, one to start the unit with all resistance in, and five for shorting out each bank of resistance.

4. The resistor, which is capable of providing up to 50% speed reduction, is tapped to give an approximate variation in speed of 60 rpm between changes. Five timing relays aid in motor acceleration.

The control reservoir with a vertical distance of four feet to be controlled contains an effective capacity of 2,400 gal. Ample space below the control area was provided to assure a flooded suction.

Operation of the control circuit may be followed by referring to Fig. 1. Assume that the control switch is in the automatic position. Further assume that the control reservoir is starting to fill. As water rises in the reservoir the first mercoid (LWCO) operates to close the circuit to the control switch. The water continues to rise until the second mercoid (FS1) operates.

This energizes auxiliary relay CRA, which closes the main contactor M and energizes timing relay 1T. The motor starts and runs at its slowest speed. If this speed is too slow to effect proper delivery into the system, the water level in the reservoir will rise and eventually close the third mercoid FS2. This energizes 1CR through the now closed contacts of 1T to operate 1A contactor shorting out the first bank of resistance, and also to energize the second time delay relay 2T. This process continues until a motor speed is reached which will cause the water level in the reservoir to remain constant.

If the control switch is placed on manual, the motor must start with all resistance in and follow the above timing sequence until all resistance has been shorted out. This reduced initial costs by eliminating the need for reduced voltage starting equipment.

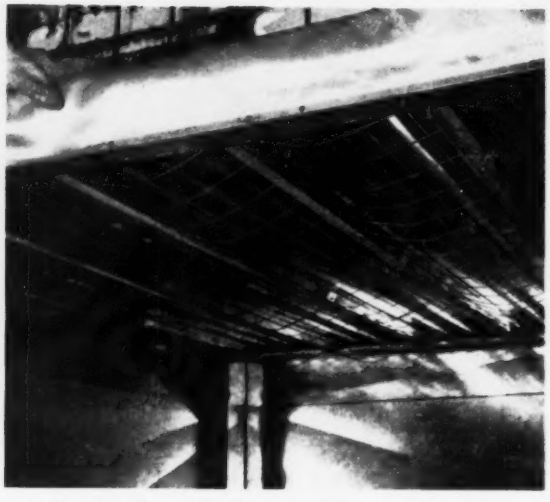
Fig. 2 shows the results of the field tests which prove to be most satisfactory. After several weeks of operation, it was found that the pump operated the majority of the time with all but one bank of resistors shorting out. This would correspond to conditions shown on test No. 2 below. This proves to be a very desirable condition, since it is still possible to operate at a higher rpm if system pressures become higher than for those originally designed.

Fig. 2

City of Rialto Booster

75-Hp Variable Speed
Wound Rotor—6-Step Speed Control

Step No.	RPM	KW Input	HP Input	Hd. in Ft.	M. I.	G. P. M.	Over-all Plant Eff. in %	Motor and Pump Eff. in %
1	1,780	59.4	79.6	244.6	96.8	871	67.6	69.1
2	1,720	57.3	76.8	217.6	102.3	921	65.9	67.7
3	1,655	53.3	71.4	198.7	101.7	915	64.3	66.2
4	1,600	51.0	68.3	175.6	103.9	935	60.8	62.8
5	1,540	48.4	64.9	164.0	104.1	937	59.8	62.1
6	1,480	45.0	60.3	148.9	103.0	927	57.9	60.1



J. R. Goodwin places a rigid sheet of plastic on the wheel-out carrier. It will be heated by elements shown at right

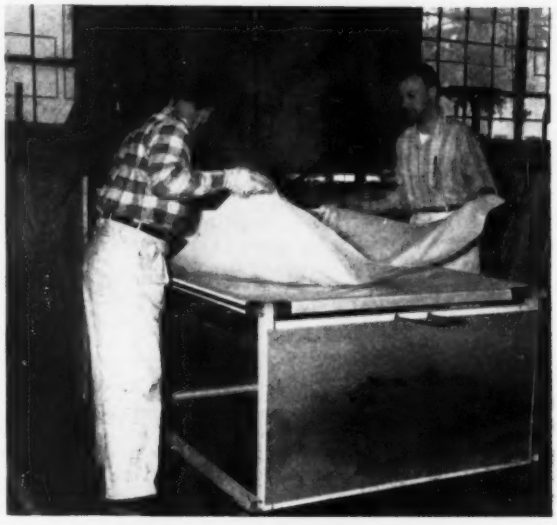
Economical Preheat of Plastics

Preheating of Plexiglas sheets before pressure forming into desired shapes has always been an important process step—and an important expense item. Form-A-Lite Plastics, Los Angeles, is now using a method that requires about 60% of the electric power required by a previous process.

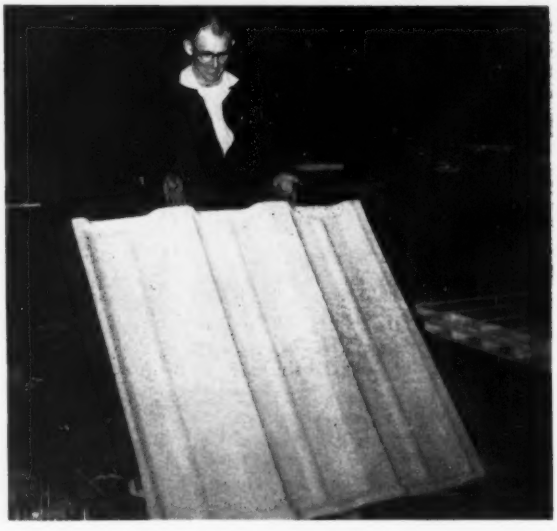
J. R. Goodwin, manager of Form-A-Lite, set out to reduce the cost of the preheat phase in the production of Plexiglas diffusers for Sunbeam lighting fixtures. He found advantages in heating elements in quartz tubes that met his specifications.

The "oven," partially designed by Goodwin, heats the plastic to a state of pliability (356 F) in about the same time as before. It requires some 2 minutes, 10 seconds up to 3 minutes, 15 seconds, depending on ambient temperatures and the temperature of the sheets. The 40% saving in power consumption comes from efficiency of heating elements in quartz tubes and a time-cycle control that Goodwin applies to the unit. While plastic is in the "oven" the elements operate constantly; but when it is removed the "oven" cycles 15 seconds on and 15 seconds off to conserve energy.

The "oven" is made up of 36 6-ft quartz tubes containing the heating elements. Each element is a 1,600-w load.



Working quickly, workmen move the hot and pliable sheet from the oven to a press that shapes it



Diffusers are made in groups of three, as shown here. The next step is to saw them apart and trim and smooth edges

ELECTRICAL WEST
Construction News

For
- contractors
- consulting engineers
- lighting engineers
- wiring designers
- distributor salesmen
- all interested

In a few words

Construction activity is spotty as the new year begins. The missile program is booming things in certain areas such as California and Utah and a shortage of electricians is reported. However, in the Seattle area a sizable number of electricians are on the bench. Springlike weather in California has speeded completion of many projects. Engineers and architects have been busy with new plans. However, bidding is still very competitive.

Lots of babble

Like the running brook, negotiations go on forever. Intermountain Chapter, NECA, in Salt Lake and Ogden was saved a trip to the Council on Industrial Relations at the last minute when contractors accepted an offer from the union to take the wages agreed previously if the subsistence clause was not immediately taken to the council. With new negotiations to open in six months this compromise was reached.

Fig. 1

Line Construction Chapter, NECA, in the Northwest agreed with Local 77 on an 18-month agreement for a 5% increase, amounting to 18¢. No settlement has been reached between the Tacoma Chapter and Local 76 where the original demand for 30¢ an hour was later reduced. Wages in the area of Local 1032 will go to $3.65 per hour Jan. 1.

Wismer & Becker, electrical contractors of Sacramento doing a large number of big power plant jobs, recently moved out of crowded quarters at 1731 S St. to a well-planned office, warehouse and plant at 7820 Folsom Blvd. Open house was held Dec. 6.

Fig. 2

Elections have been taking place in all NECA chapters or will do so in January. Among the announced elections are the following:

Puget Sound Chapter, Seattle, Howard Bayley (1) re-elected president; Kernan Dennis, vice-president; Charles Meagher re-elected as treasurer; with Frank Holert, Lloyd Larsen, Don Close, Irving Chapman as additional board members.

Los Angeles Chapter re-elected A. L. Berg (2) as its president; Stanley A. Brekhus, vice-president; J. B. Shamel, treasurer; and Richard E. Arbogast as governor. On the board of directors John J. Flynn of Alhambra; Andrew L. Hannon, F. S. Kellstrom and Allen F. Knic-Krehm, Los Angeles; C. W. Voorhies, Riverside; Sidney F. Hill, Los Angeles; Anthony Carbone, Wilmington; Rex M. Grissom, Santa Ana; B. Hartman, Long Beach; Charles Stetson, Los Angeles; Charles A. Wikle, Los Angeles. A vacancy in San Bernardino has not been filled. The chapter plans its 10th Annual Ladies Night party for the installation of its new officers at the Beverly Hilton Jan. 10. With the California-Nevada conference scheduled the same day, it is possible the chapter may play host to the conference attendees also.

Fig. 3

San Mateo County Chapter, NECA, re-elected Everett L. Marshall (3) as its president with Carl Porter vice-president; Stan Fitschen, treasurer; William Gillard, W. D. Rigler, Ernest Canete directors.

Santa Clara-San Benito Chapter, NECA, elected Kelvin

Fig. 4

Young (4) as president to succeed Paul Leslie, with Jim Sardella as secretary-treasurer; Walter Lisk vice-president; and Irving Butcher (5) governor.

Dates for the combined Districts 6,8 and 9, NECA, spring conference have been announced by A. L. Rowe, vice-president, District 8, Great Falls, Mont. The meeting will be held at Glacier Park Lodge June 22-24.

Southern Colorado Chapter, NECA, recently moved from 119 N. Nevada St. to 2201 N. Weber St. in Colorado Springs. Simon Halle is manager.

Fig. 5

Asking $25,000 damages, Wasatch Line Construction Co. of Salt Lake City has filed suit against the REA and Moon Lake REA in particular, charging that REA had harassed and demoralized its employees and refused to recognize all claims of the contractor for additional time and compensation. Norman Forsberg, president of Wasatch, obtained an injunction until the case could be heard. The dispute arose over a construction contract to build 43 miles of transmission lines. As many as 70 new poles were relocated, it is charged, and revisions have been made in the plans and specifications.

A. J. Sanguinetti, owner of Collins Electric Co. and affiliated companies to the Stockton contracting firm, was given a big write-up in the Stockton Record recently, outlining the many projects the firm has done. In addition to Collins Electric in Stockton, the firm owns Delta Switchboard Co., Home Wiring Co. of Stockton and Acme-Collins Co. in Nevada. The firm was originally founded by the late W. J. Collins.

Lou H. Spott, the young electrical contractor who practically pioneered the luminous ceiling, died Dec. 16, age 44, as the result of a coughing spasm, in Oakland, his home. He succeeded to the presidency of Spott Electrical Co., founded in 1908 by his father, and later formed Spott Electrical Co. of Hayward. Although not active in contracting himself recently, he had devoted considerable time to developing new products. The luminous ceiling was one, his own office having had the first 200 f-c job. He was likewise active in the development of the hexagonal cell aluminum panels for light diffusion.

Northern California Chapter, NECA, although it had not yet elected its chapter officers, held elections in its three branches. Ed Hutka of Livermore was re-elected chairman of the Alameda County Branch with Ted Buttner vice-chairman. A. P. Chairman was elected branch chairman in Contra Costa County and Willard McKibben vice-chairman. Harold Pierce was elected Solano-Napa Counties branch chairman with Bob Covey vice-chairman. A sub office of the chapter was opened at 1235 Boulevard Way, Walnut Creek, with assistant manager Larry Rodgers, under direction of Ernest Kramm, serving as field representative for the Contra Costa and Solano-Napa groups.

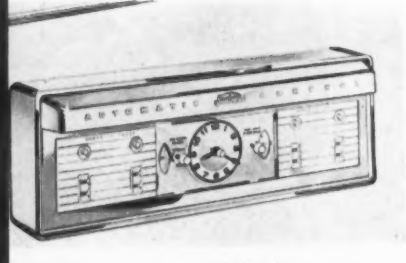


Fig. 6

A long needed device to make adequate wiring for appliance use visible has been developed by Sunbeam. It is an attractive control panel containing four or six appliance outlets, each one protected with a circuit breaker. In the center is a clock for automatic timing of appliances plugged in to one appliance outlet. The panel center is to be wired with a three-wire, 220-v circuit to provide adequate capacity for the appliance, and should make contractors a good selling tool, one that can be visualized by the customer, either for a new home or in modernizing a kitchen of an old home. (6)

Codes by Reference are OK if—

The Agnew vs City of Culver City case has stirred up so many doubts that it is causing undue concern among city inspection departments. Whether other local ordinances are also invalidated by that supreme court decision is the question. The Culver City ordinance was invalidated on two scores; that it required a license fee for regulatory purposes and that it adopted the National Electrical Code as prima facie evidence of conformity with approved standards of safety to life and property.

Of the fee situation some ordinances are being rewritten to require fees as a means of deriving revenue to the city rather than as a regulatory measure. Recent notices sent out to electrical contractors by the Construction Industry Legislative Council of California advise contractors to check their local ordinances carefully and decide thereafter whether to pay their yearly license under protest or go to court themselves and refuse to pay.

To clarify the legality of city ordinances adopting the National Electrical Code or other standards by reference, the legal department of the League of California Cities was asked for an opinion. His advice, contained in the Newsletter of that league, follows (the italics are used editorially to emphasize certain aspects):

It has been brought to the attention of the league office that some doubt still exists concerning the right of California cities to adopt uniform electrical, building and other codes by reference, as a result of the decision in *Agnew vs City of Culver City*, 147 C.A. 2d, 144. That case also raised some doubts concerning the authority of California cities to impose license taxes upon state-licensed contractors for revenue purposes. These were completely removed by the recent decision in *Agnew vs City of Los Angeles*, 158 A.C.A. 706.

In addition to the basic authority of the city to license electrical contractors, *Agnew vs Culver City* dealt with the validity of provisions of the Culver City ordinance making "conformity with the regulations as laid down in the National Electrical Code as approved by the American Standards Assn," as "prima facie evidence of conformity with approved standards of safety to life and property" required by the ordinance. The ordinance further provided that labeling in conformity with the standards of "Underwriters' Laboratory Inc., the American Standards Assn. Inc. and the U. S. Bureau of Standards, or other similar institutions of recognized standing" were "prima facie evidence of conformity with approved standards of safety to life and property."

It is to be noted that the ordinance provisions in question purported *to make the standards* of the named private organizations "prima facie" evidence of the standards required and *did not adopt them by reference* pursuant to sections 50022.1, et seq. of the Government Code or otherwise. On the basis of this set of facts the court held that the standards in question were an invalid delegation of the power of the city legislative body to the mentioned private associations. Also implicit in the decision is the rule that *future amendments of a private code may not be adopted by reference*, and may be made a part of the city ordinance *only by re-enactment* of the code.

Thus, it is safe to say that *Agnew vs Culver City* does not cast doubt on the adoption of uniform codes by reference pursuant to sections 50022.1 et seq. of the Government Code, but does hold invalid any attempt to make private codes or standards "prima facie" evidence of ordinance requirements, or to adopt by reference future amendments of private codes.

Clarified

Status of examinations for electrical contractors' licenses in Utah has been cleared up for our readers by a direct quotation from the minutes of the advisory board of the State Department of Contractors. This was supplied by Donald B. Hadley, assistant administrator, who called attention to an error in reporting on the subject. The minutes tell of the steps being taken to prepare examinations.

"The examinations compiled by the various trade organizations were presented to the board for its approval. The board recommended that the various trade organizations appoint not less than five persons who were not connected with the preparation of the tests, to take the examinations under similar circumstances required by an applicant, in order to establish an equitable passing grade. The board further recommended that the department contact the various schools in California, or elsewhere, which prepare applicants for contractor's examinations, to determine if they could assist in writing the various examinations and study guides for the preparation of the Utah examinations."

He called attention to the fact that no mention of electrical examinations was made by the board. None are ready as yet.

Fluorescent lighting for a tennis court was given probably its first trial in Tucson at its Racquet Club and found to have many advantages—uniform distribution, economy of operation, no spill of light to adjacent areas. G-E units are mounted on two 120-ft cables, 25 ft above the courts, 12 fixtures 100 w each on each cable. Stroboscopic effect is eliminated by wiring three-phase to the ballasts. Power usage runs only 2.95 kw per hour and uniform intensity of 10 f-c prevails

Motors and Controls—I

Cruelty to Motors

Tom Hughes, Electrical Safety Engineer, California Division of Industrial Safety

AS an inspector of electrical installations in industrial properties for the state, the author is used to seeing gross mistreatment of electric motors. Having previously spent 17 years in engineering for a company that used all types of motors and treated them as the faithful work horses they are, we feel it is time that motors should be given their "day in court."

Hoping that the prevalent neglect and misuse of motors by the average user is due mostly to ignorance and misunderstanding, we shall try in these articles to cover briefly the aspects of proper application. Everyone knows that when you hire men and women workers you have to provide light, heat, rest rooms and other forms of comfort, yet the average person buys motors, to take the place of employees, and sticks them down in some dark, damp or hot hole where they can't possibly be maintained.

The rules for installation of motors, as found in electrical codes and insurance company check-off lists, do not begin to recognize the problems involved. The research men and designers of motors and control equipment can design equipment to overcome the difficulties of every predicament but only the users can appraise and properly control the final application.

In the use of transformers we are concerned mainly with the cleanness of their cooling oil and maintaining temperature below the safe maximum limit. Too many people try to place the use of motors in as simple a category as transformers. The result is the common sight of 15 or 20 burnt-out motors kicking around in the junk of an average plant.

One important reason that electric motors have displaced every other form of power for stationary use, clear out in the remotest rural scenes, is that they can be used to do things that no other form of power can do logically.

If this be true, then it must be apparent that it takes hundreds of different styles and types to supply all these needs and you don't just order a motor of a certain speed and horsepower from the Montgomery Ward catalog.

Of course, we shall make no attempt to catalog the types of motors available. The motor manufacturers provide specialists in the job of choosing the proper type of motor for solving special needs. These men are known as sales application engineers. There is no charge for their services but the user of motors is throwing countless dollars out the window by not consulting them, when he is considering a new line-up in loads.

No rodeo pony was ever abused in so many ways as his horsepower successor, the faithful electric motor. From real field observation this inspector begins a new series of telltale articles on the uses and abuses of motors. They will be worth saving and passing on to men new in the electrical trade anywhere.—The Editor

Understanding the Problems

Regardless of the nature of your loads or the types of motors you will end up using, the two prime considerations are acceleration of the load and dissipation of the heat developed in the motor.

The manufacturer of motors works continually toward better acceleration of every type of load without producing too much heat. On the other hand, the insurance people, fire prevention authorities and code-making experts are concerned only with holding the line on this process of developing heat. Somewhere in between, the user (or some expert in his employ) must satisfy the needs of his particular loads with what the manufacturer can provide and still keep the rise of temperature within bounds.

In past generations, good business and survival was mostly a matter of self-discipline and outguessing your competitor but the present generation has reached a point where self-discipline is only elemental and survival depends on continual and intensive study. The race for technological supremacy in all businesses is going to be so keen that the present dog-eat-dog underbidding will be left on the side lines. Dependability eventually must outrank price.

Now what we are trying to do is convince the reader that he is going to have to start paying attention to those basic fundamentals of natural law that some underpaid science teacher tried to teach him in high school, if he is going to survive in the next 10 years. Whether you are a wire-jerker, electrical contractor, plant engineer or owner, your economic welfare is going to depend on the reputation you establish for correctly applying technical "know-how."

With every movement to be performed by a motor or actuated by a solenoid and timed by electronic systems, the application is going to be highly critical. These days of installing any old motor and then slugging the fuses and bridging the relay heaters if it doesn't work are just about over. So let's learn the game now before the chips are down.

To keep things straight, before we start our text, we should point out here that in all the discussions of these articles we are going to be covering only alternating-current, three-phase, induction motors. While some of our considerations would apply to single-phase and d-c machines, those are both complex subjects requiring specialists. You could spend a lifetime with either group and never encounter all their possible variations of design.

(Next — What Accelerating the Load Demands of a Motor)

A dealer incentive program giving salesmen a chance at $125 a day in small cash prizes and a $100 grand prize manned the booths for distributors. Here during one of the drawings is Clark Chamberlain, San Diego bureau secretary-manager: Al McCutcheon, of the contractors division; Hostess Erma Westcott of San Diego State College; and Lloyd Bouton

Sunday crowds jammed the Exposition Hall at Balboa Park, looked over the merchandise carefully. Many returned later in the week to make the rounds again and very often to place orders. Almost hidden here is a monitor-top refrigerator, part of the "then and now" display featured in a number of show booths and including a 3-in. 1926 television set. TV and hi-fi were popular items in the show

San Diego Show Celebrates 25 Years

San Diego Bureau of Home Appliances broke attendance records again with its silver anniversary electric and home show.

A top attraction was a public demonstration of stereo sound by a group of 15 appliance dealers, who showed individual equipment in their own booths. A blocked-off area, accommodating several hundred at a time, was used for a short lecture and demonstration.

According to tradition, a mile of Christmas lights was turned on at the start of the show. The week-end crowd was probably the biggest in history and it is estimated that 190,000 saw the show.

Ed Furstenfeld of Merchandising Distributors, Inc., and Wilma Furstenfeld of H. L. Benbough, had a full line of '59 Norge appliances on display. Right: Leona Lieblich, Frigidaire home economist in the Los Angeles area, shows her company's refrigerator display

Gene Lambeth of Distributors Inc. shows features of '59 Westinghouse laundry pair

Hotpoint had its new line of built-ins recently shown to dealers in the far West

Bob McGuire demonstrates the new Philco TV, controlled from chair side

Frank Tracy, Sierra Pacific — Harry McGann, PG and E — B. L. Poor, WNG

R. L. Engel, Allis-Chalmers — K. C. Christensen, PG and E — C. H. Gueffroy, NNG

PCEA-PCGA Administrative Services group . . .

Looking Over the Horizon

More than 220 delegates attended the joint Fall Administrative Services conference of the Pacific Coast Electrical Assn. and the Pacific Coast Gas Assn. to set a new all-time registration record. The meeting was held Nov. 19 and 20 at the Claremont Hotel in Berkeley.

C. V. Griffith, Northwest Natural Gas Co., and E. B. Kruger, Southern California Edison Co., were co-chairmen, and distinguishing their leadership this year in addition to the attendance record is the introduction of a new discussion group called "Investor Relations."

Customer Relations

E. J. Wright, Sponsor

Enriched employee training programs in customer relations, design and introduction of new forms for recording customer requests and a re-evaluation of advertising have all helped Southern California Edison improve customer relations in the past 18 months. Jack L. Forney reported on the experience of Edison with a customer opinion survey conducted by an outside consultant. The survey revealed that more than 13% of the customers requesting service were dissatisfied at the time the service was considered by the personnel handling the request. After an employee training program was started, the employees caught the spirit of it and the customer dissatisfaction has been reduced more than 5% in the relatively short time since.

C. E. Trimmer, Southern California Gas, noted a utility company trend toward extending meter reading and billing period from monthly to bimonthly and even quarterly periods. The trend is stimulated by increasing costs of labor, machine rental, bill forms, envelopes and postage. While there are a number of outstanding successes in bimonthly or quarterly billing to show as examples, fear of adverse customer relations and potential increase in bad debt loss still act as deterrents to universal acceptance of the system.

Customers who require the establishment of service or the repeated turning on or shutting off of service are the ones who should pay the added cost, according to experience gained by San Diego Gas & Electric after two years of using account opening charges. Fred J. Wright, reporting on the experience, said this appears more reasonable than the former method of assessing the established, long-time customer with a portion of these costs in his tariff schedule.

R. O. Fedderson, Arizona Public Service Co., directed a group discussion on closing bills, the collection problem child of the utility industry. Discussion revealed that companies are trying many different methods of reducing the write off and are on alert constantly for new and improved ideas.

Francis F. Crocker, California Electric Power Co., K. O. Goodge, Southern Counties Gas Co., and F. U. Naylor, Pacific Gas and Electric Co., were other customer relations section discussion leaders.

Right-of-Way and Land

Stanley B. Barton, Sponsor

Morriss C. Foster of Pacific Northwest Pipeline Corp. proposed that the Land and Right-of-Way sections of PCEA and PCGA sponsor the preparation of a model condemnation law for eventual adoption by Western state legislatures.

His suggestion is the outgrowth of complications and unfair expense forced on his company as it constructed the Pacific Northwest pipeline. The experience of the company reveals that state condemnation procedures instead of striking a balance between the need for the right of condemnation and the protection of owners of private property tend to lay heavily in favor of the property owner, largely because the legislation was enacted by elected property owners. He recommends for correction of this inbalance the appointment of a committee from the Administrative Services sections that would prepare an initial draft of a model law. The committee would then secure review, criticism and suggestion from all helpful sources, particularly other utility groups and the American Bar Assn. committee on uniform statutes. Through this means a final draft of a model uniform law would be constructed. The

committee would then submit the final draft to PCEA and PCGA for review and, if necessary, endorsement. All this would be just the preliminary spadework in securing the adoption of such a law by various states.

Public utilities obtaining licenses and permits from government agencies, covering use by the utilities of lands of the United States, are faced with certain ambiguities and incongruities in the public laws and regulations governing such uses. Charles A. Whitney of Southern California Edison presented a historical analysis and study of the nature of the public lands, public laws and regulations, and pointed out the ones that should be amended to make them clear, fair and equitable to all concerned. Chief contributor to the complications of dealing with the United States is that through the years, since about 1920, responsibility for the government lands has passed to different agencies while basic laws have not changed.

Charles F. Humphrey, Southern California Gas, in his talk on "Utility Position in the Master Zoning Plan," strongly recommended utility cooperation with local government planning agencies in the formulation of the design of community master plans. He emphasized that this is the best way to avoid the consequences of trying to alter it piecemeal in later years in order to find places for operating bases, transmission lines and other facilities. He urged utility participation in formulation of the design and accompanying ordinances.

Land and Right-of-Way delegates were, of course, extremely interested in the federal highway program and its effect upon utility systems. Kenneth J. Diercks, PG and E, in leading off discussion on the subject, noted that the federal legislation of 1956 and 1958 with respect to utility reimbursement for relocation of facilities did not furnish the utilities with the answers to their problem, but it did at least provide an effective tool for many. He said it can be expected that with continued perseverance improvements may be made in the years to come. What utilities must do, to control costs, is be organized to process highway relocation work together with system improvement work.

Other discussion leaders were Wayne S. Hansen, Mountain Fuel Supply Co., William Simpson, Arizona Public Service Co., J. L. Fogarty and C. F. Humphrey, Southern California Gas.

Joseph S. Long
NNG

R. A. Gormsen
So. Calif. Gas

Stanley Barton
PG and E

Arizona's Feddersen speaks as Sponsor E. J. Wright (center) of San Diego G&E listens in

Internal Auditing

R. E. Allard, Sponsor

"The scope of internal auditing should be broader than that of most other functions within an organization, except perhaps those of top management," according to R. E. Allard, Southern Counties Gas Co. Allard said that internal audit programs should be broad enough to include reviewing management policies, procedures, controls and to give the internal auditor the freedom to evaluate their consistency, adequacy and to measure compliance with procedures. Scope limitation in audit programs should be one of direction, not restrictions.

Selling the services of the internal auditing department means searching out the what—why—when—where—who of operations for management and offering ways and means for them to determine that their responsibilities have been adequately discharged, according to Allard. If something is going wrong, it is more important to talk about how it will be corrected than who is to blame.

Allard also led discussion on internal audit staff organization.

In defining the qualifications for auditors, he favored a four-year college education with at least one year of accounting experience. The auditor should be able to make and leave favorable impressions on his contacts, should have a high standard of personal conduct, and should be responsible, to conform with the freedom of action necessary to the auditing function. He should consider himself a personal representative of management. Pleasing personality, diplomacy and ability to discuss matters equally well with management and operating people are attributes Allard values.

Whether the auditor is a specialist or an all-around man is usually governed by the size of the company

Sponsors W. T. Quinsler, Arizona, and R. E. Allard, Southern Counties, relax after session

and, therefore, the size of the audit staff. By and large, Allard spoke in favor of the specialist because it establishes an expert in the accounting department to draw opinions from. He said the operating people feel freer to discuss problems with the specialist. A handicap is found in personnel turnover, which will occasionally take a specialist from the audit group. The alternative recommended by Allard is to use the specialized approach but rotate auditors so they gain diversified backgrounds.

J. L. Holleran, Southwest Gas Corp., told the group that it is necessary for internal auditing to check the content of reports to management regularly and provide a gage by which the information contained in such reports may be evaluated. This is accomplished by direct reports to management by the internal auditor. He said the internal auditor's report to management should review each function of the company at least once a year.

In order to have independent appraisal of standards of performance, the internal auditor must have a satisfactory degree of independence, according to E. M. Byrge, Southwest Gas Corp. He said internal auditing has a very definite and important responsibility to management for helping them by appraising company standards of performance. The field is wide open and there are opportunities unlimited for valuable service.

Reiterating in essence what had been said before, B. E. Woodburn, Southern California Edison Co., said, "It should be understood throughout a company that employees in audit staff organization have full and free access to all departments and records without restrictions as to its audit activities. The internal auditor is able to cross all departmental lines, both horizontal and vertical. Only on this freeway of rights and privileges may the internal audit staff be the eyes and ears of management."

T. E. Parker, Pacific Gas and Electric Co., speaking on the subject of "Financial Audits," emphasized that it is the responsibility of the auditor to avoid unnecessary examinations of records and transactions and wasteful repetition of work already performed. Components of the financial audit are cash (including working funds and accounts receivable), material and supplies, disbursements, and revenue (including various liability deposit accounts).

Phil C. Brown Jr., Pacific Northwest Pipeline Corp., defined internal auditing as an internal management consultant service. In its broadest form, it ascertains the extent of compliance with company plans, policies and procedures and makes recommendations that result in better labor relations, greater operating efficiency and higher profits.

Systems and Procedures

Joseph S. Long, Sponsor

Some systems are self-contained within small sections, some within departments, some are concerned with company-wide operations, but to be successful each recommendation and procedure must gain the acceptance of line department, according to G. E. Wilcox, Southern California Edison. In double harness with the line responsibility is the staff responsibility to provide creative thinking to problems of administration. A carefully picked and trained systems staff, understanding its place in this tandem relationship with the line department, can have a terrific impact on the well being of the entire organization.

In discussing a forms control program, C. R. Sweany and V. T. Gellatly, both of Northwest Natural Gas, emphasized the importance of proper design, consolidation, proper identification and supply and distribution economies. Because forms, in a sense, represent work and the kind of work that is usually regarded as overhead, then it becomes important to give skillful attention to each of these factors.

Joseph F. Illick, PG and E, described a "participative approach" recently used in a review of paper work in 15 local customer service offices. Phases of the study were common to any systems and procedures study, but the innovation of getting the participation of employees and supervisors brought satisfactory results. He reported that the acceptance of changes was facilitated because the employees participated in the development of some of the changes.

John R. Kleespies, PG and E, described tools and techniques of systems work but said, "The most important consideration is people." Encouraging the employees on the job to participate in the study will more nearly assure success in devising and installing better procedures. Training other employees in what systems analysts do and how they do it will stimulate an interest in cost reduction throughout the company at the point where the costs arise—at the work place.

Investor Relations

William T. Quinsler, Sponsor

Under the intriguing title "Put Your Mouth Where Your Money Is," the newest section in the Administrative Services conference launched its first discussions.

Birth of the new group is attributed to a phenomenal growth situation in the Western states, which is sending utility companies to the money market to secure outside capital to keep up with the expanding economy. This, in turn, requires the utilities to continually study, analyze and approve the investor relations programs. Some of the components of such a program are: seeing that people know about the respective companies, informing present security holders, attracting the unsophisticated investor.

CIRCLE A-W PRODUCTS CO.

INCORPORATED

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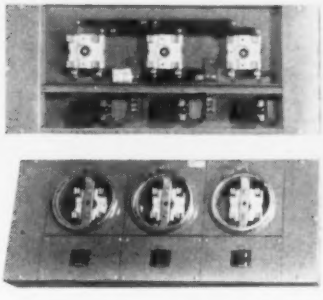
dated Dec. 31, 1958

METER TROUGH - METERING DEVICES

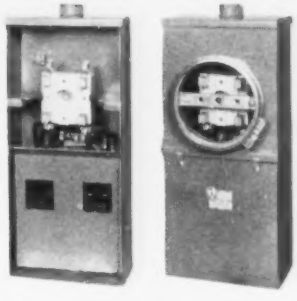
ADDITION TO CATALOG

LISTED WITH UNDERWRITERS' LABORATORIES, INC.



AWM 135
100 Amp. indoor service equipment. Combined 50 Amp. Breakers or less TQL or R General Electric Prewired. Available, vertical or horizontal, in 100-150-200 Amp. Buss rating.

AW2M3R2
200 Amp. Outdoor service equipment. Pre-wired. Available with 1 or 2 100 Amp. Murray Breakers or less.



AW1M2R 1¼ or 1½
100 Amp. outdoor service equipment. Pre-wired. Available with 1 or 2 Murray breakers.

INDOOR and OUTDOOR METER SOCKETS

CATALOG NUMBERS

Meter Sockets

OUTDOOR

100 Amp. with or without bussing

01HF	01VF	021VS
02HF	02VF	022VS
03HF	03VF	023VS
04HF	04VF	024VS
05HF	05VF	025VS
06HF	06VF	026VS

G1VF	G1HF
G2VF	G2HF
G3VF	G3HF

Meter Sockets

INDOOR

100 Amp. with or without bussing

171HS	171VS
172HS	172VS
173HS	173VS
174HS	174VS
175HS	175VS
176HS	176VS

100 Amp. Meter Socket w/Manual Circuit closing device.

OUTDOOR/INDOOR

121314	121324
121315	121325

Meter Sockets

100 Amp. Safety Socket Box OUTDOOR

12144
12145

100 Amp. Residential Comb. Meter and Underground Pull Box.

12174
12175
12178

100 Amp. Polyphase Meter Socket OUTDOOR/INDOOR

051HS8
051HS7

FOR BRICK VENEER MOUNTING

G1HFB — 100 Amp. Meter Socket
AW204FB — 200 Amp. Meter Socket

OUTDOOR

200 Amp. Meter Socket

AW204
AW204F

Surface or flush meter socket 4/0 wire capacity

AW194

w/manual circuit closing device.

AW264

200 Amp. HEAVY DUTY Commercial Residential Safety Socket. Combination Meter Socket and Pull Box.

AW205XG
AW205XGF
AW204XG
AW204XGF

BUSSED METER TROUGH

100 Amp. Meter Socket

200 Amp. Buss rating

012HS-HD
013HS-HD
014HS-HD
015HS-HD
016HS-HD

100 to 150 Amp. Buss rating

Meter Trough with or without bussing

011HS
012HS
013HS
014HS
015HS
016HS

OUTDOOR

100 Amp. Meter Socket

920
925
927
928

INDOOR

100 Amp. Meter Socket

910
915
917
918

CIRCLE A-W PRODUCTS SOLD BY ELECTRICAL WHOLESALERS ONLY

Harry Burton of Batten, Barton, Durstin and Osborne Inc., San Francisco, discussed the subject of stockholder advertising. He said the success of all stockholder advertising depends on reaching as many interested people as possible, as often as possible, with an intelligent presentation of the facts. The message must be truthful, clear and of genuine value to the reader. "You are dead if you sound the least bit patronizing," he said. "Remind yourself frequently that you are building an image of your company with each piece of advertising you create."

The financial analyst outlook was presented by John Peter Trenholm of Estabrook & Co., who said that the financial analyst is in search of information that can be sorted, interpreted and disseminated as a service to investors. The analyst is engaged in a perpetual process of testing the authenticity and tendencies of statistics and policies, and relating these evaluations to market prices, existent and potential. He recommended that large corporations having a particularly heavy and recurrent analyst relationship expand their present public or stockholder relations departments to include a wing devoted exclusively to dealing with the financial fraternity. It would be a useful clearing house for published information having more of the detail that financial analysts incessantly ask for.

The use of electronic computers by Arizona Public Service to record stock transfer transactions was described by Robert B. Nairn of that company. Conversion to EDP method saves the company about $20,000 annually, he said, as compared with the costs of conventional methods, but an important by-product is that the company is able to obtain valuable summary and statistical information that aids management in its financing programs.

Sherman Chickering of Chickering & Gregory discussed the legal aspects of investor relations. With case history illustrations, he showed that the law imposes few restrictions on relations or communications with investors. The primary concern is compliance with SEC's Release 3844, which relates to communications immediately prior to and during the offering period of a new issue. Its purpose is to prevent activities that are designed to stimulate or have the effect of provoking an interest in an offering of securities before all the material facts required by the statute to be disclosed to prospective investors respecting an offering are made available.

Calender of Meetings—1959

FEBRUARY

2- 6—*Western Winter Market*, Western Merchandise Mart, San Francisco.

8-14—*National Electrical Week.*

12—*Intermountain Electrical Assn.*, annual conference, Hotel Newhouse, Salt Lake City.

12-13—*Pacific Coast Electrical Assn.*, Business Development Section conference, Hotel Sheraton-Palace, San Francisco.

14—*Snake River Valley Electrical* Assn., annual conference, Boise.

MARCH

24-26—*Electrical Maintenance Engineers Assn. of So. Calif.*, biennial conference, Los Angeles, Calif.

30-31—*PCEA*, Engineering & Operating Section conference, Hotel Lafayette, Long Beach.

APRIL

6- 9—*Rural Electric Generating Cooperatives*, 10th annual operating conference, Hilton Hotel, Albuquerque.

8- 9—*PCEA*, Administrative Services Section conference, Hotel Lafayette, Long Beach.

19-21—*Rocky Mountain Electrical League*, spring conference, Continental Motor Hotel, Denver.

22-24—*Northwest Electric Light & Power Assn.*, Engineering & Operating Section, Personnel and Safety Section, Purchasing Committee, Hotel Utah, Salt Lake City.

24-25—*Rocky Mountain Electrical Manufacturers Representatives Club*, Electrical Exhibit, Tower Merchandise Mart, Denver.

24-29—*Bureau of Home Appliances of San Diego County*, spring conference, also Spring Fair, Balboa Park, San Diego.

26-May 1—*International Association of Electrical Inspectors*, annual meeting of Idaho, Utah, Montana and Nevada Chapters.

27-29—*National Assn. of Lighting Maintenance Contractors*, annual conference, Hotel Cosmopolitan, Denver.

MAY

6- 8—*Institute of Radio Engineers*, regional conference and trade show, University of New Mexico, Albuquerque.

11-12—*Illuminating Engineering Society*, Intermountain region conference, Hotel Continental, Denver.

18-20—*NELPA*, Business Development Section, Advertising and Public Relations Committee, Rate Research Committee, Multnomah Hotel, Portland.

20-22—*PCEA*, annual convention, Hotel Fairmont, San Francisco.

24-27—*IIEE-ISA-ARS-IAS*, Telemetering Conference, Brown Palace and Cosmopolitan Hotel, Denver.

25—*Northwest Public Power Assn.*, annual membership meeting, Hotel Olympic, Seattle.

26-29—*IES*, Pacific Northwest region conference, Banff Springs Hotel, Banff, Alberta, Canada.

26-28—*American Public Power Assn.*, annual national convention, Hotel Olympic, Seattle.

JUNE

1- 6—*NELPA*, Accounting and Business Practice Section, Finlen Hotel, Butte.

21-26—*American Institute of Electrical Engineers*, Pacific general meeting, Hotel Olympic, Seattle.

22-24—*National Electrical Contractors Assn.*, joint conference of Districts 6, 8 and 9, Glacier Lodge, Glacier National Park.

22-26—*Western Summer Market*, Western Merchandise Mart, San Francisco.

28-July 3—*Los Angeles Market*, Los Angeles Furniture Mart.

AUGUST

10-13—*International Association of Electrical Leagues*, annual conference, Hotel El Cortez, San Diego.

18-21—*Western Electrical Show and Convention*, Cow Palace, San Francisco.

24-26—*International Association of Electrical Inspectors*, Northwestern Section annual meeting, Seattle.

31-Sept. 3—*IAEI*, Southwestern Section annual meeting, Hotel Flamingo, Santa Rosa, Calif.

SEPTEMBER

7-11—*Illuminating Engineering Society*, National Technical Conference, Mark Hopkins and Fairmont Hotels, San Francisco.

16-18—*AIEE-ASME*, Engineering Management Conference, Los Angeles.

25—*Intermountain Electrical Assn.*, Fall Dealer Conference, Newhouse Hotel, Salt Lake City.

28-30—*NELPA*, annual convention, Hotel Vancouver, Vancouver, B. C.

OCTOBER

25-29—*RMEL*, annual convention, Broadmoor Hotel, Colorado Springs.

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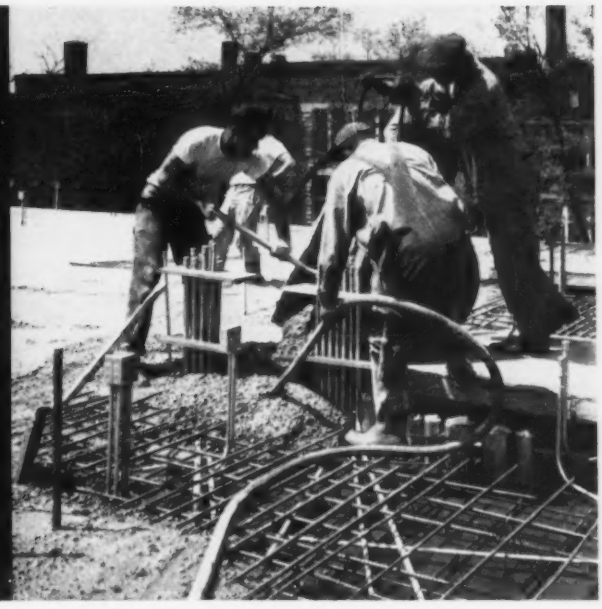
Republic ELECTRUNITE E.M.T.

...again proves



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ELECTRUNITE's tightly adhering galvanized coating protects against corrosion. It won't chip or flake off during bending. No threads to cut. Uniform concentricity assures snug fit of couplings and connectors—shutting out moisture and concrete. Thousands of installations, some made 25 years ago, using millions of feet of ELECTRUNITE E.M.T., are proof of service.

Republic ELECTRUNITE E.M.T. is produced to ASA Specifications C80.3, Federal Specifications WW-T806, and carries the Underwriters' Seal of Inspection. For additional information, send coupon today.

The Republic ELECTRUNITE E.M.T. installation photo above was taken during the construction of this attractive six-story resident student's apartment building on the campus of a leading Midwest university.

Architect: Burnham & Hammond, Chicago, Illinois
General Contractor: B. W. Handler Construction Co., Chicago, Ill.
Electrical Contractor: Gibson Electric Company, Inc., Chicago Ill.

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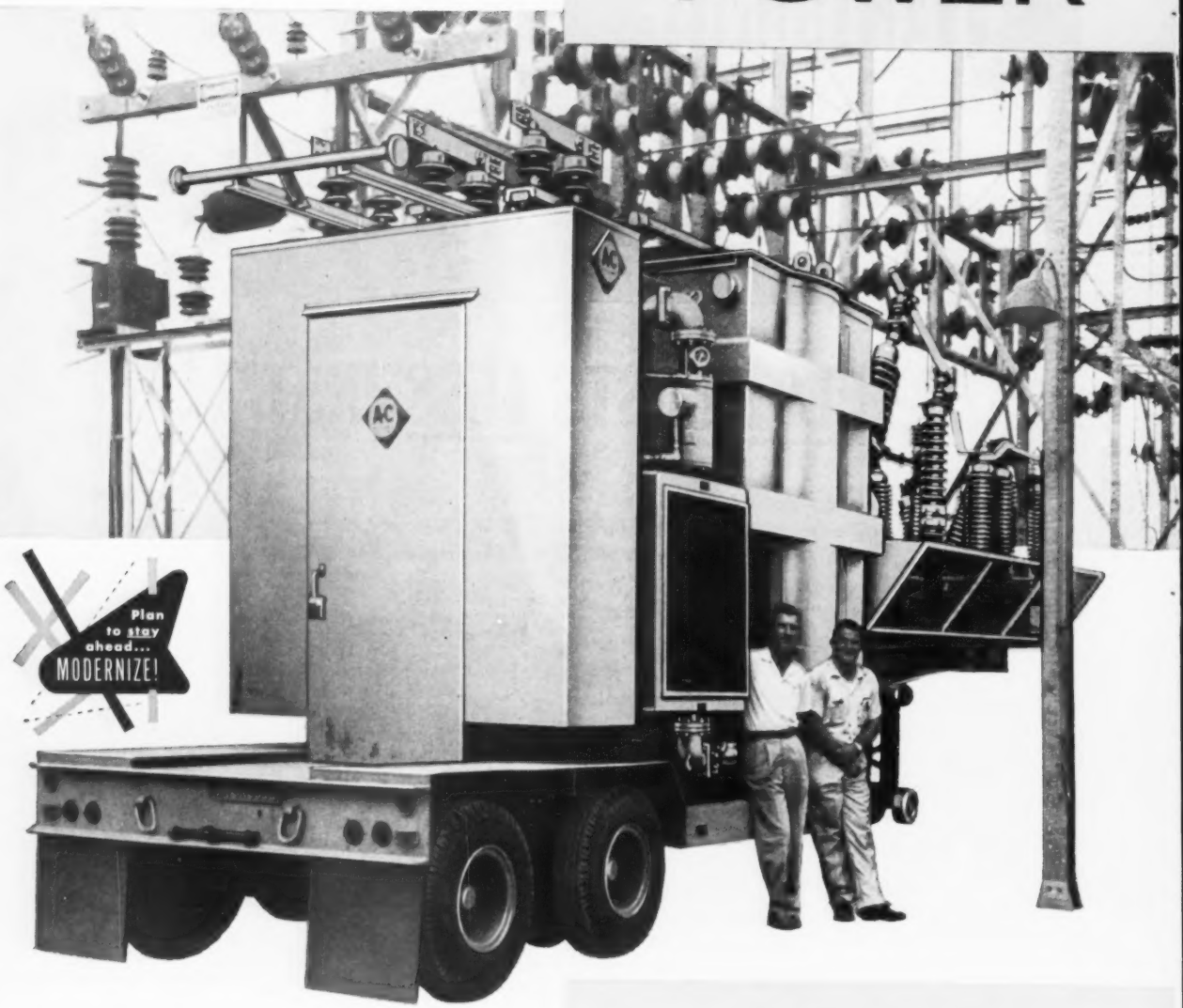
ALLIS-CHALMERS

POWER



Mobile

ALLIS-CHALMERS

on wheels

Allis-Chalmers Mobile Substations

Modern Solution to: **Power Failures**

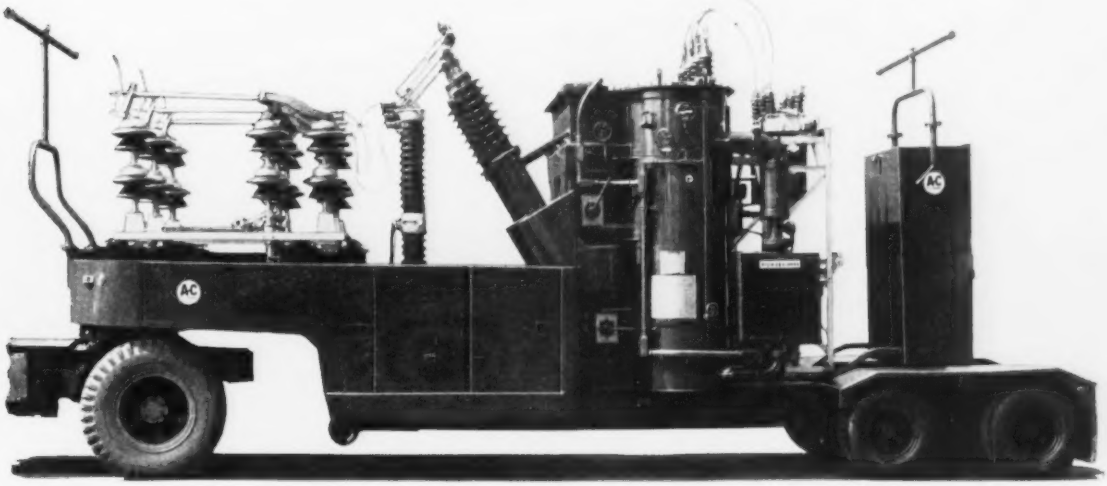
. . . Bypassing Substations

. . . Temporary Loads . . . New Loads

The mobile substation is fast becoming indispensable equipment for utilities. "Power on wheels" has not only proved its worth in quick restoration of service in emergencies, but has also proved a valuable help in maintaining everyday service continuity under circumstances which ordinarily impair or disrupt service.

The sturdy Allis-Chalmers mobile unit is a complete substation — it includes: transformer, high voltage switch, lightning arresters, fuses, and low voltage switchgear.

Call your A-C man for a detailed description of this modern mobile unit, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.



Substations

Standard basic designs are available for Allis-Chalmers mobile substations through 10,000 kva, 69 kv and below. These units may have two or three high voltages and several low voltages connectable either delta or wye.

For larger mobile substations, special design considerations may be required.

ALLIS-CHALMERS

A-5844

UTILITY VARSITY CLASS OF '54—Line: Jerry Harrington, Montana Power Co.; Bob Person, Public Service Co. of Colorado; Bob Sessions, Bob Overstreet, Idaho Power Co.; Ted Fox, B. C. Electric Co.; George Brunzell, John Riner, Washington Water Power Co.; backfield: Vic Casebolt, Washington Water Power Co.; Bob Hall, Idaho Power; Paul Yetter, Public Service Co. of Colorado; Jack Jones, California-Pacific Utilities Co. Five year enrollment in PUEC is 169 utility men

U of Idaho builds the executive team as . . .

Utility Men Go Back to College

D. M. Pritchett, Personnel Director, and **V. V. Lyman,** Purchasing Agent
California-Pacific Utilities Co., San Francisco

Each summer, usually during the month of July, 30 to 35 utility executives travel to the University of Idaho at Moscow. They go there to attend the Public Utility Executives' Course presented by the College of Business Administration of the University. They are accountants, engineers, managers, salesmen, superintendents, purchasing agents, personnel and public relations directors, and vice-presidents. Titles mean nothing. All pretense, pride and prejudice, if any, is quickly cast aside and forgotten in favor of study and discussion of mutual interests and problems.

These latter-day students live, eat and study in one of the university men's dormitory. Comfortable lounges contribute to pleasant and restful surroundings. Attractive classroom facilities, the university library and the beautiful campus, together with Moscow's temperate summer climate, add much to the program. Excellent food is prepared and served under the supervision of the university's dietitian. Much of the food, especially poultry and dairy products, comes from the university farm. Weight control soon becomes a topic of general conversation.

Outside classroom activities include golf, swimming, baseball, horseshoes, little theater, a beautiful park—much more than free time from the books will allow for.

Classroom lectures and discussions are held in the dormitory. The lectures and discussions are under competent faculty men drawn from all over the nation. The program runs on a 5½-day week, six hours a day. Evenings are used for study and informal discussion in preparation for the next day's classes.

Considerable emphasis is placed upon information about the availability of facts, resource materials and analysis for guidance in making management policy decisions.

I—Certificate awarded

A certificate from the university is awarded upon satisfactory completion of the course. At the 1958 program, the subjects covered 126 classroom hours and all enrollees took the entire program.

The course is open to public utility company executives or "middle-management" men employed by private industry. There are no formal education requirements. It is recognized that much of the value is self-generated by the enrollees' discussions of their special fields. For this reason, applications are screened for the purpose of providing as wide a range of company participation and of individual experience and viewpoints as possible.

Admission is limited to a maximum of 40. Minimum enrollment to permit the full course offering is 30. The fee per person is $550. This covers registration, books, single room and board, the cost of instructors and speakers, and recreational activities. The fee covers over-all costs and does not provide a profit to the university.

Credit for the birth of the public utility executives' course goes to T. E. Roach and R. H. Sessions, president and personnel director, respectively, of the Idaho Power Co., and to Dr. D. J. Hart, former dean of the College of Business Administration at the University of Idaho. It was Mr. Roach who first thought of adopting such a course for his own company's training program. He sent Mr. Sessions to the University of Idaho to discuss the matter with university officials. It was then agreed that the College of Business Administration could offer such a course whereby executives of several utility companies could come to the uni-

versity for this specialized training.

Mr. Roach recognized that the future business climate might be well tempered by the objectives of this program and what it could do for privately owned utility enterprise and for the public.

The objectives are: (1) to meet the demand for the development of men with a management point of view; (2) to accelerate the transition to executive responsibility by enhancing awareness, evaluating attitudes and by organizing basic insights into problems of top management.

The courses offered are closely linked to the above objectives:

- Accounting—as a tool of management financial administration
- Business Economics
- Public Utility Regulations
- Executive Communications
- Public Relations
- Rates and Costs
- Human Relations in Industry
- Management Policies and Procedures

Dr. Erwin C. Graue of the College of Business Administration was soon placed in charge of developing the full program and it has been under his direction since 1956. Dr. Graue's dynamic personality and vigor, as well as his vast knowledge of economics, have played a major part in the success of the program.

Top Flight instruction and the will to learn make the course. Left, Dr. Graue discusses business cycles; right, the boys hold a post mortem after class

II—It It Practical?

Utility men are quick to ask, "Is it practical?" Here are Dr. Graue's thoughts on how the program melds the theoretical and the practical:

"The objectives of the PUEC are all practical and, therefore, call for a complementary function of theory that is proved by practical experience. A theory can be tenable only on the support of facts. The facts must be found by searching them out, by arranging them and by analyzing them in the light of experience. This is the process of organized thinking that the executive uses to get the job done.

"The main currents of learning of this century are directed by science and economics. It is silly to suppose that there is no practical scholarship, that theories are mere hypothetical premises and that academic (theoretical) discussions are metaphysical abstractions. There is nothing metaphysical about cost efficiencies and the study of men and markets. Their understanding requires sharp thinking, an analytical temper and an ability to communicate lucidly in what is to be done or how the problem is to be solved."

Close association between faculty and students has resulted in mutual understanding and lasting friendship. Perhaps the best measure of the program is in the statements from utility executives interested in the course.

III—What They Say

E. K. Albert

President
California-Pacific
Utilities Co.

"I am an enthusiastic booster for this course because it provides a means for uncovering and developing latent executive ability. It is one of the few business administration courses that is beamed directly at the fundamentals of our business."

M. C. Titus

Vice-President
American & Foreign
Power Co. Inc.

"The course enables the utilities to further the development of its middle management people in the philosophy and ethics of modern management, thus assisting them to meet their needs for leadership in a rapidly expanding industry."

W. D. Skinner

District Manager
Pacific Gas and
Electric Co.

"Through high-caliber instruction of subject matter essential to the utility industry, and by providing the opportunity for management personnel to think beyond the boundaries of their present jobs, PUEC, at Moscow, Idaho, is filling a void of long standing."

Distribution of Enrollees by Occupation

Vice-president (engineering, sales)	6
Accounting and finance	32
Engineering and operation	45
Division and district managers	46
Assistant division managers	9
Sales	15
Personnel and public relations	11
Purchasing and stores	5
Total	**169**

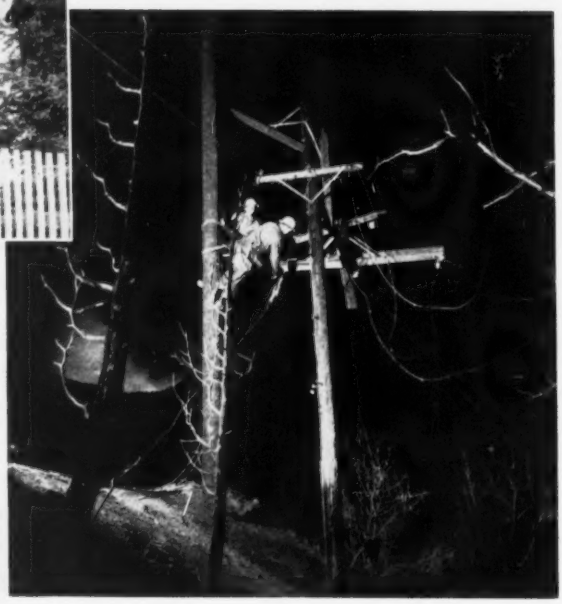
Age Distribution of Enrollees

	1958	1957	1956	1955	1954	Total 5 Years
Under 39	10	7	9	3	7	36
40 - 49	14	13	14	20	16	77
50	5	14	15	12	10	56
Total	**29**	**34**	**38**	**35**	**33**	**169**

news

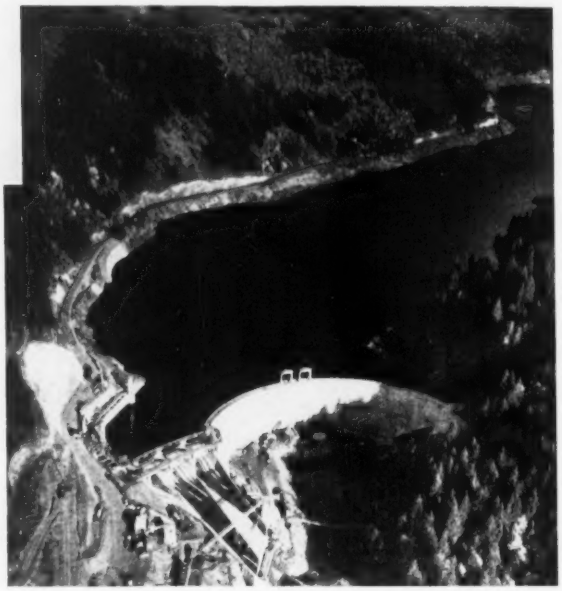
This attractive Christmas Center at National City, Calif., solved a safety problem by eliminating the tradifional stringers, often attached illegally to utility poles, not meeting PUC specifications

An emergency crew of 115 was put into action by Southern California Edison in the wake of the December Malibu fire. Insulator washing rigs were used as "fire trucks" and mobile radio units helped coordinate effort. Operator Clamille Istre Jr. remained on duty at Crater Substation even when menaced by flames on three sides. Picture at right shows some of damage



Portland General Electric's North Fork project went on the line recently. Aerial view, below, shows arch-type dam with power house at the base of the downtown side and a portion of the four-mile lake. The lake, located only 35 miles southeast of Portland, is expected to become a highly popular recreational area. Project will have capability of 53,000 kw

Putting a new 165,000-kw unit on the line at Hunters Point are: N. R. Sutherland, PG and E president; San Francisco Mayor George Christopher; and Shermer L. Sibley, vice-president



Maj. Gen. R. L. Howze presents a citation to Royal Miller of Sacramento Municipal Utility District for cooperation with the Armed Forces Reserve program. James E. McCaffrey of SMUD is in center

EW

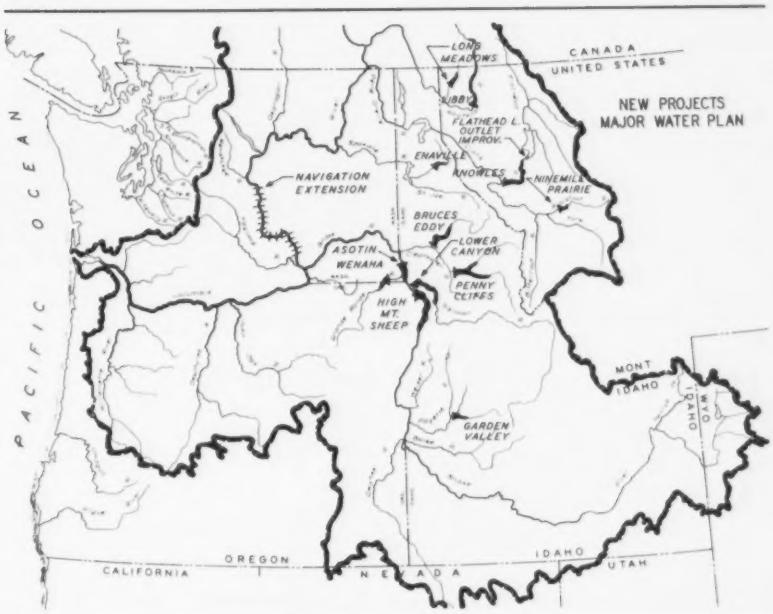
Management

Master Plan for Columbia

A comprehensive water plan for the Columbia River Basin has been released by the Army Corps of Engineers. Involved are projects which would develop 3,178,750 kw of installed power capacity at an estimated cost of $1.8 billion. Storage facilities for 32,000,000 acre-ft of water are envisaged with the completion of the program which, in essence, would completely harness the power potential of the Columbia Basin in the U. S.

Major new projects called for in the program are shown in the accompanying table. Existing plants or plants for which federal authorization has already been given are not included. Of interest, however, is the addition of the Knowles project in Montana and recommendations for the high Mountain Sheep Dam on the Washington-Oregon boundary at essentially the same site on the Snake River that was initially authorized for the Pacific Northwest Power Co.

Idaho would receive the lion's share of the proposed new power development with five projects (including one on the Washington-Idaho boundary) totaling 1,135,700 kw. Largest of all the projects is the high Mountain Sheep Dam with 600,000 kw of installed capacity.



Major Hydro Development Recommended by Corps of Engineers

		Capacity	Cost
Montana			
Long Meadows	Yaak River	9,000 kw	$ 25,700,000
Nine Mile Prairie	Blackfoot River	60,000 kw	54,800,000
Knowles	Clark Fork	256,000 kw	234,900,000
Idaho			
Enaville	Coeur d'Alene River	30,000 kw	78,000,000
Garden Valley	Payette River	285,700 kw	146,100,000
Penny Cliffs	MF Clearwater River	292,000 kw	210,000,000
Bruces Eddy	NF Clearwater River	240,000 kw	127,100,000
Asotin	Snake River	288,000 kw	125,600,000
Washington-Oregon			
Wenaha	Grand Ronde River	134,000 kw	94,500,000
High Mountain Sheep	Snake River	600,000 kw	226,300,000

Oroville Design Firmed Up

Engineers are ready but the problems of California's water allocation threatened to hold up construction of the first unit of the Feather River project until politicians can come to a meeting of the minds. The State Department of Water Resources has decided that the Oroville Dam will be of the earthfill type, 725 ft high with a crest length of 5,000 ft. It will be the largest earthfill dam in the world and impound waters of the Feather River for use in a 600,000-kw power house.

The bottom 150 ft of the dam will be a high concrete "plug" in which the power house will be located and completely covered by the earthfill. The report states that the earthfill dam was selected over four concrete dam designs because it was cheaper and safer.

NEWS INDEX

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Commission Backs "Free Speech"

Utah's Public Service Commission has gone on record opposing the Federal Power Commission's proposal to limit the use of institutional advertising by investor-owned public utilities. UPSC's chairman, Hal S. Bennett, has addressed a letter to FPC, stating in part: "It is unfair for a regulatory commission to deprive investor-owned utilities of the privilege of bringing facts concerning public power competition to their customers while their competi-

tors (tax-supported utilities) are free to carry on advertising and other similar programs on an unrestricted basis."

In adding that to curtail the investor-owned utilities in explanation of their side of controversial issues would be to invade their right of free speech, Bennett went on to say that the Utah Power & Light Co. is not only entitled to, but should, meet competition of publicity, promotion and advertising on the part of proponents of public power.

Three Western Companies Nominated For Award

Three Western utilities were included in the five companies nominated for the Edison Award. They are:

Arizona Public Service Co., for its pioneering work on computer applications.

Idaho Power Co., for its fight to preserve Hells Canyon for free enterprise.

Pacific Gas and Electric Co., for pioneering in atomic energy without cost to the taxpayers.

Philadelphia Electric and Alabama Power were the Eastern utilities nominated.

Each of the five companies was asked to submit a presentation from which the winner will be selected.

PG and E to Tap Earth's Heat

Permission to build a geothermal steam-electric generating plant at The Geysers in Sonoma County has been requested by Pacific Gas and Electric Co. from the California Public Utilities Commission. The company has advised the commission that an agreement has been reached with two companies which have been developing steam wells whereby the latter will deliver steam for a 12,500-kw turbogenerator unit. The project is expected to require the investment of approximately $2 million for plant and related transmission facilities and the plant is expected to be operating by April 1960.

The proposed contract calls for a second unit at the same location when additional steam is available. This will be the first geothermal plant in North America and also will be the world's first privately financed natural steam plant. Power generation from natural steam is being accomplished in two other areas of the world through government-subsidized stations in Italy and New Zealand.

New Street Lights for Denver

Enthusiastic support for the Downtown Denver Improvements Assn. proposal to install a new million-dollar street lighting system in the central business district indicates a brighter 1959 for the intermountain metropolis. Property owners would pay $345,724 and the Public Service Co. of Colorado about twice that amount to install new poles, underground wiring and new lighting fixtures.

The city government, which would have to pay about 25% more for power, has given its endorsement as a means of keeping the downtown district progressive.

Of the two proposals made for financing the installation, a voluntary plan under which property owners would pay a prorated share on a front-footage basis shows a four-to-one preference over the establishment of a special assessment district. The former method would permit businessmen to deduct the contribution as a business expense.

Growth

New Generation for PP&L

Pacific Power & Light Co.'s new Dave Johnston plant, located on North Platte River near Glenrock, Wyo., will bring 100,000 kw of new power to this area. Veryl Hoover, Wyoming general manager, said the inauguration of power production from the plant should touch off an industrial boom in Wyoming.

At the same time, the $56 million Swift hydroelectric project on the Lewis River is filling and should reach production level sometime in December.

Installation and testing of the third 45,000-kw generator at the Merwin project is virtually completed, rounding out a really big year for new generation on PP&L's system.

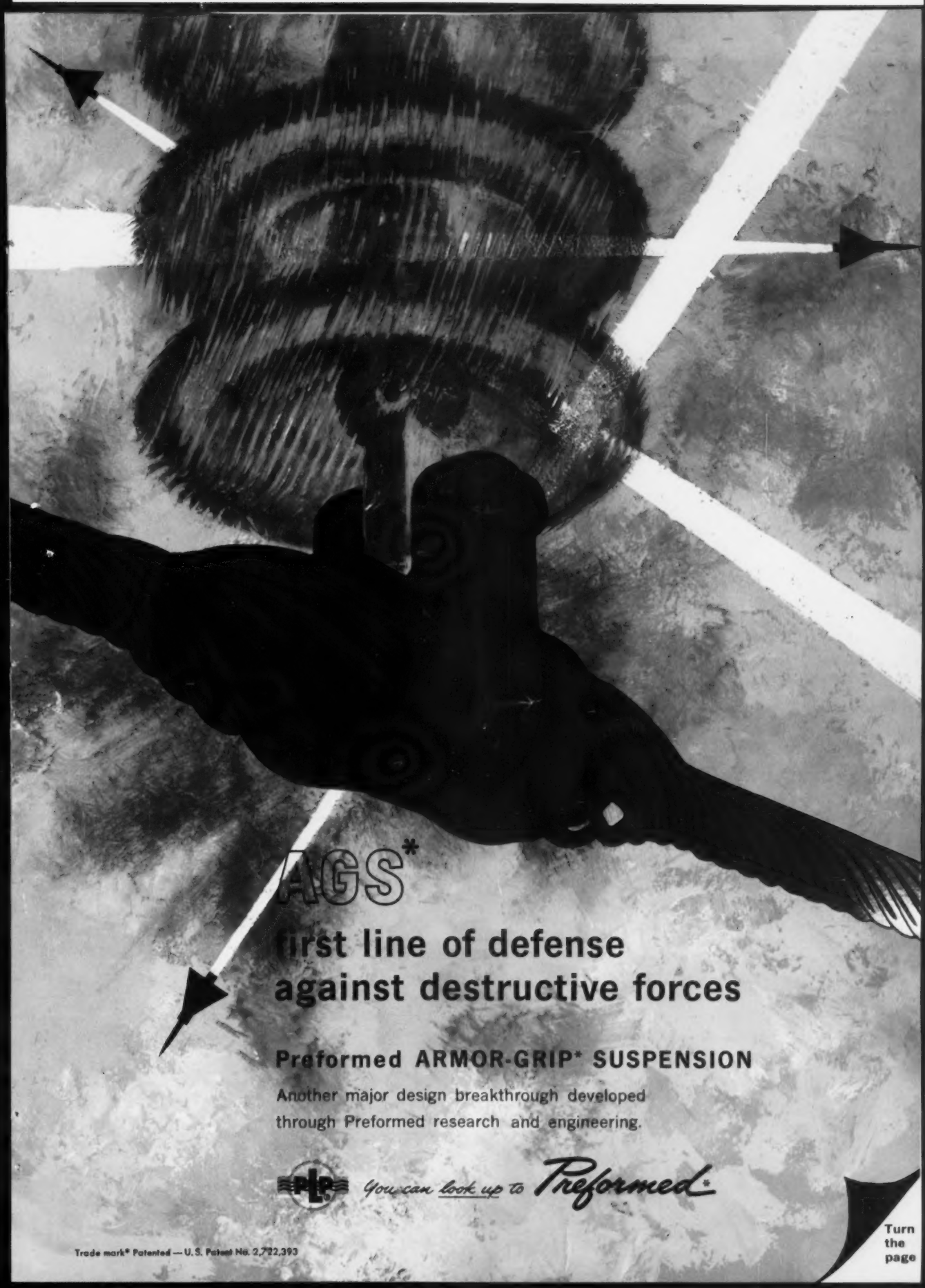
► Puget Sound Power & Light has scheduled a $3,750,000 power receiving substation to be constructed adjacent to BPA's Renton sub. Seattle City Light is also planning a $7,500,000 substation at nearby Tukwila. The substations will receive power from Rocky Reach and Priest Rapids dams now under construction on the Columbia River.

► Portland General Electric Co.'s $20,000,000 North Fork project went on line as PGE President Frank Warren Jr. activated the first of the plant's two, 16,200-kw generators. Completion of the North Fork project will mark the addition by PGE of 198,000 kw of capability to the Northwest Power Pool in the last 11 months, according to O. E. Walsh, vice-president. The utility's Pelton Dam on the Deschutes River added 120,000 kw, and addition of a generator at Faraday power house below North Fork added another 25,000 kw. PGE has developed a 16-acre recreational area on the shores of the four-mile lake.

► Seattle City Light's Diablo plant is now generating up to 159,000 kw, an increase of 27,000 kw over its previous capacity. The modernization program that increased the generating capacity was a good bargain for City Light, according to Supt. Paul J. Raver. "It added 27,000 kw capacity at a cost of less than $750,000, which is much less than the average cost of hydroelectric installations at the present time."

► B. C. Electric Co.'s second submarine power link between the mainland and Vancouver Island was energized Dec. 1, doubling the electric power available to the areas served by the company on the island. The first link, completed in 1956, provided the world's largest capacity submarine circuit and the world's longest unspliced underwater power cable of high capacity. The new underwater link travels 15.5 miles from Tsawwassen Beach to Galiano Island, then overhead to Parker Island, and underwater again for three miles between Parker and Salt Spring Island. The gap between Salt Spring and Vancouver is crossed by overhead lines.

► Seattle City Light's proposed plan for diverting the Skagit River for second-stage construction of the Gorge High Dam has been okayed as a result of studies now nearing completion at the University of Washington's hydraulics laboratory. "Nature of the diversion channel is such that it is difficult to predict its performance on theoretical considerations alone," said Supt. Paul J. Raver. "The water must be diverted sharply in directing it to the low block in the first stage of the dam and then back to the present channel."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See other side

Market Development

New Features

Features of the 1959 Westinghouse line include a single dial oven control for automatic meat cooking; air sweep interior shelves and tilt-down door shelves on freezers; an automatic washer that offers a choice of 11 programs by push button; a refrigerator compartment that keeps meat fresh for seven days without freezing.

The new development in meat roasting is claimed to keep meat temperature steady for as long as six hours after cooking, without loss of flavor or juiciness. It automatically cooks meat to near the desired doneness at 325°, then oven temperature is reduced gradually until it is the same as the meat temperature. Cooking stops as the meat and oven temperatures balance.

The new meat keeper holds 10 lb at the proper temperature and humidity without freezing under a continuous flow of fresh, refrigerated air from the cold injector. The cold injector is said to recover cold loss from door openings up to four times faster than conventional refrigerator systems.

With the machine doing the "thinking" a control sets up the proper wash and rinse time and temperature, spin speeds and other conditions within the selected program for specific fabrics. The 1000 automatic washer has a program computer that carries out any of 11 separate washing programs. With the dryer the operator dials any of eight programs, using one control.

New Lines

Norris Thermador is marketing three new products.

It started production in December on a ceiling heater, which it describes as "an entirely new concept and design." Fitting flush against the ceiling, the 1,250-w, 120-v heater is housed in a stainless steel case and has an aluminum reflector and grill. A 6½-in. four-bladed fan draws the air into the center of the heater and expels it around the perimeter of the case. Thus any direct blast of air is eliminated and heated air is circulated throughout the room. A nichrome heating element produces radiant heat.

Two other new lines, to be on the market this month, are stainless steel vertical double oven in five colors and a baseboard heating unit.

New model Westinghouse refrigerators offer optional color in up to 35 different combinations by removable panels. These panels are adaptable to washer and dryer doors

Changes at SYB

Sues, Young & Brown, Los Angeles distributor of Zenith and Typhoon products, has made top management changes. E. E. Young, a cofounder of the firm and its secretary-treasurer, became president on retirement of M. G. Sues. R. F. Young succeeded him as secretary-treasurer and J. M. Sues was made vice-president in charge of advertising. Clarence Brown continues as vice-president and E. J. Dymek as vice-president in charge of sales.

Sues, active in the industry since 1921, is retiring to devote full time to his ranching interest. Young, for 32 years in the radio and TV distrubution business, was with Leo J. Meyberg Co. for 19 years as executive vice-president.

Consignment Program

A new approach to marketing portable electric appliances was started by Sunbeam in its West Coast test consignment program.

Under the plan, the company will consign its appliance line in the States of California, Oregon and Washington to selected distributors who will become distributor agents. All dealers are to be given equal treatment as required by the Robinson-Patman Act, but no resale price maintenance will be involved since the sale through the agent will be the original sale by Sunbeam.

A dealer contract to be offered selected dealers will require display, advertising and promotional participation. While these contract dealers will be the core of the business, the plan calls for servicing dealers whose volume does not exceed three Sunbeam appliances a month without requiring them to be under contract.

A local cooperative advertising and service plan will provide promotional allowances and a wide choice will enable dealers to participate regardless of the size of their operations.

Sunbeam has announced that it will use every lawful means to prevent its products from being used in connection with off-premises bait advertising.

Westerner Receives National Appointment

Marguerite Fenner, director of home economics for Pacific Gas and Electric Co., has been named by Secretary of Agriculture Ezra Taft Benson to the Agriculture Department's home economics research advisory committee.

Mrs. Fenner

The 15-member advisory committee recommends research projects to help solve the problems of farmers, food packers, food distributors and consumers.

Mrs. Fenner was assigned to assist in studies of housing and household equipment. Only member from the Far West, she succeeds Elizabeth Sweeney Herbert, an editor of *McCall's* magazine on the committee, which met Dec. 8-10 in Washington, D. C.

Mrs. Fenner joined PG and E as a home economist for the Sacramento division and was named director of home economics for the system in 1944.

► **George L. Cane,** who originated and organized the Sacramento Valley Electrical League, died in Sacramento Oct. 25 following a heart attack. He was manager of the Sacramento Municipal Utility District's sales development department, having started as an assistant dealer sales representative in 1947. Before going with SMUD, he worked for the Philco Corp. for 16 years.

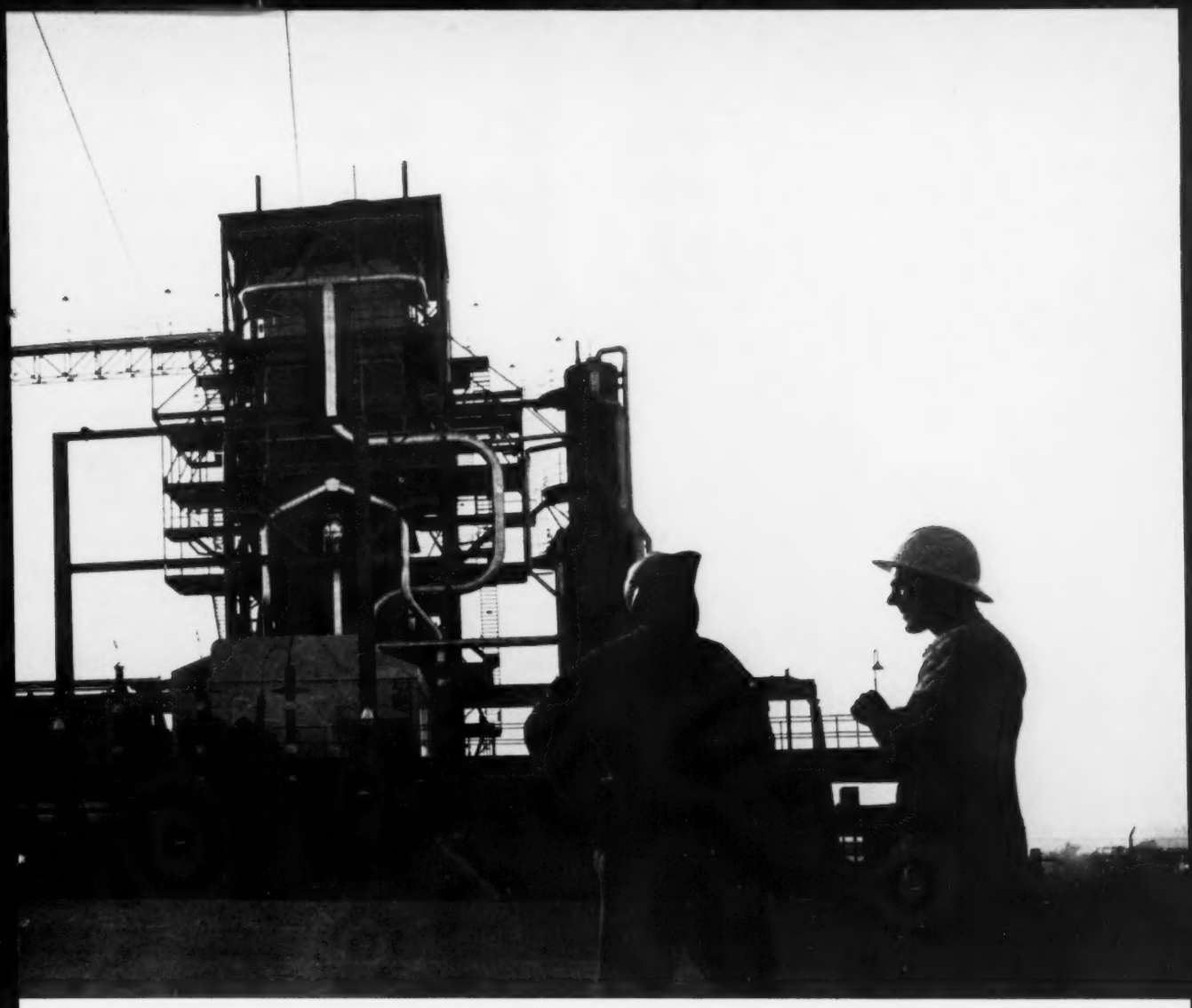
► **Marlen N. Davis** has been named manager of the sales development department to succeed the late George L. Cane. He had been supervisor of SMUD's commercial and industrial sales division.

New Plant at San Bernardino

The two-unit, 132-m.w. steam plant recently completed at San Bernardino for California Electric Power Company has a number of unusual features.

There are only two operating levels—grade and firing aisle. A broad ramp permits access to the firing aisle by large trucks, and on both levels clearances are ample so that equipment can be serviced by fork-lifts. All rotating equipment, except turbo-generators, is mounted at ground level, minimizing vibration and simplifying maintenance.

All feedwater heaters, together with many pumps and other auxiliary items, are located in a bay between the two turbo-generators, where they are easily accessible to the gantry crane and to fork-lift maintenance trucks.



The plant burns natural gas or heavy residual fuel oil. A unique oil pumping system eliminates the need for heated lines from storage to day tank.

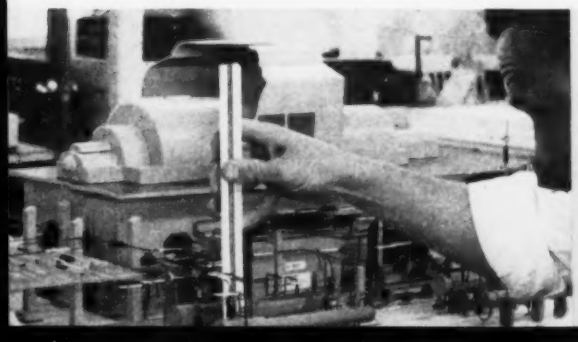
All principal water tanks are combined into two 82-foot "pisa towers" which support the deaerators, and all sweet-water condensates drain into two collecting wells sunk 42 feet below ground level.

The plant is operated by three men per shift. Both units were completed ahead of schedule and below the cost estimate, and both were placed in commercial operation within two weeks after first roll-over.

Structural layout and all important details were worked out on a scale model before any drafting was done. Calectric engineers were able to watch their plant grow in three dimensions, approving each detail as it was added to the model.

The plant was built by Fluor under a total-responsibility contract covering economic study, design, engineering and construction. This arrangement enabled Calectric to exercise complete day-to-day control over the entire course of the project, in close liaison with Fluor project management.

The Fluor brochure, "Calectric's San Bernardino Steam Plant," describes this unusual station in detail. Write to Department #21, The Fluor Corporation, Ltd., 2500 South Atlantic Boulevard, Los Angeles 22, California.



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People

Piantanida

Guibara

► **L. M. Guibara** has been appointed insulated products manager, Western region, and **R. R. Piantanida** Western electrical conductor regional manager, of Kaiser Aluminum & Chemical Sales Inc. Both are located at Oakland. Also announced is the establishment of a large warehouse for insulated electrical conductor products at Los Angeles. The appointments are the initial steps in a program to keep pace with steadily increasing sales of aluminum conductor in the 11 Western states. Guibara joined Kaiser Aluminum in 1957 as Western regional manager when the company acquired the electrical wire and cable department of U. S. Rubber Co. He is a director of PCEA and has recently been made a representative of NEMA. Piantanida was district manager at Kaiser's Miami office before assuming his new position. He joined the company in 1952 as an electrical conductor salesman in Los Angeles after serving 11 years with Pacific Gas and Electric Co.

► **Fred J. Bertolone** has been promoted to San Francisco district sales manager of All-Brite Fluorescent Fixtures Inc. Bertolone will integrate sales, engineering and service in northern California, with particular emphasis on distributor and contractor relations. He has extensive experience with prominent manufacturers, distributors and electrical contractors. He has been with All-Brite a number of years.

Bertolone

► **Carl H. Borquist,** assistant chief of design for Bonneville Power Administration, and **Theodore W. Stringfield,** BPA's head of electronics and communications design, have been elevated to grade of Fellow of the AIEE.

► **Harvey O. Banks** has been reappointed as director of the state department of water resources by California's Governor-elect Edmund G. Brown. Banks was originally appointed by Republican Governor Goodwin Knight. **Ralph M. Brody,** Sacramento lawyer, was named special counsel on water affairs and also deputy director under Banks.

► **Fred K. Hagar,** Denver district manager of General Electric's appliance and merchandise department, retired recently after 39 years of service. He joined G-E in Omaha in 1919, and had held a district managership in Salt Lake City 11 years before transferring to Denver in 1957.

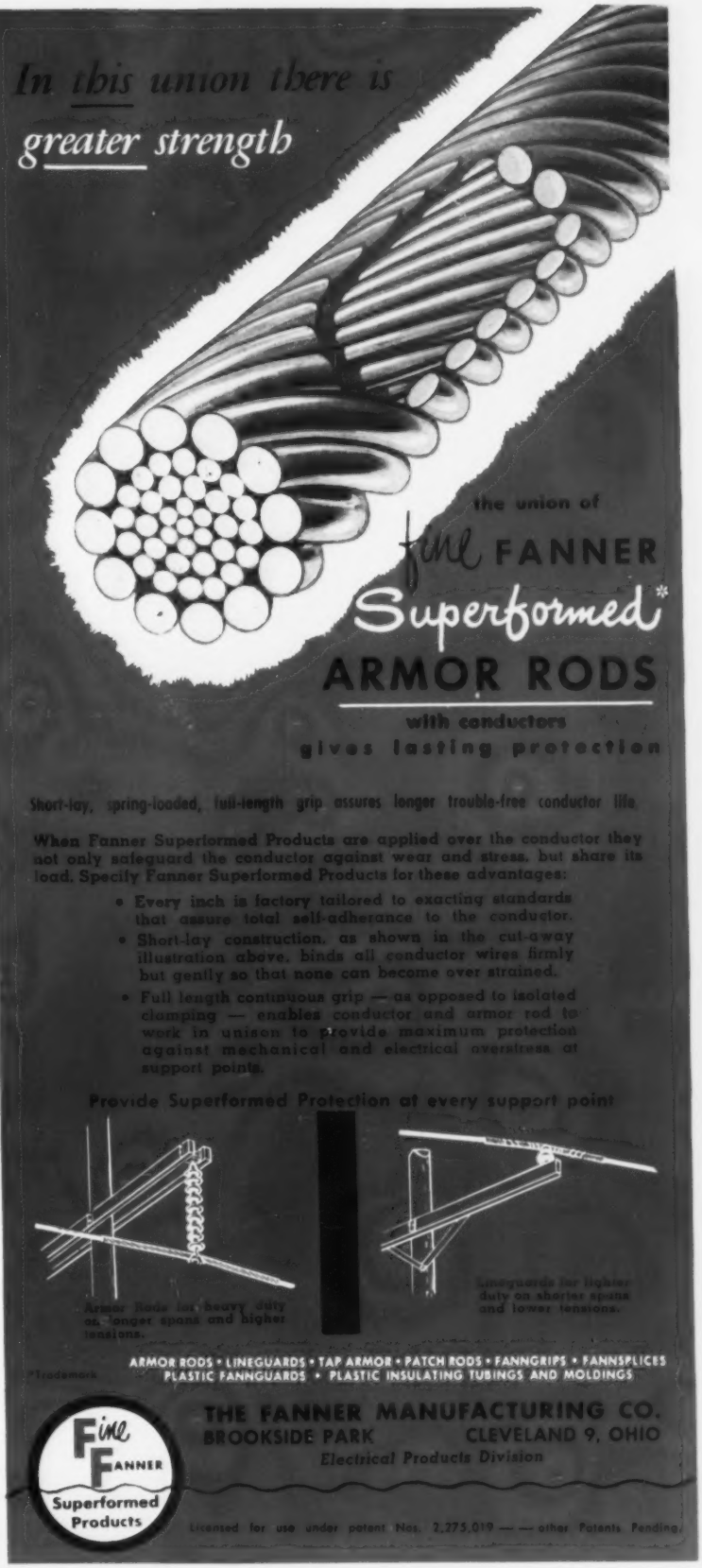
► **Alan Purchase** and **W. G. Lowe** are new managers appointed for the San Francisco district by Allis-Chalmers Industries Group. Purchase will head up petroleum and chemical sales, and Lowe industrial sales. Purchase is a graduate of the University of California and joined Allis-Chalmers in 1949. Lowe has been a sales representative with the company since 1953, and holds a master's degree in electrical engineering from the University of Washington.

► **Arthur C. Westrom** has been appointed director of engineering, research and development of Hubbard & Co. He replaces **Clarence H. LeVee,** who has resigned. Westrom has been with the Hubbard organization since 1950 as assistant director of research, also as director of research, electrical apparatus. He is largely responsible for many of the autogap and fuse cutout designs that have been produced by the department.

Westrom

► **Paul Neihart** has started his six-year term as commissioner for PUD of Grant County. He replaced **Fred Arlt** of Wilson Creek, who had been a member of the commission for 13 years. The commission elected **William Schempp** as president, **George Schuster** as vice-president and assistant secretary, and Neihart as secretary.

► **C. D. Dempsey** has been promoted to division plant superintendent of the Spokane division of Washington Water Power Co. **R. C. Smolinski** will replace Dempsey in the Palouse division at Pullman.


In this union there is greater strength
the union of fine FANNER Superformed* ARMOR RODS
with conductors gives lasting protection
Short-lay, spring-loaded, full-length grip assures longer trouble-free conductor life.
When Fanner Superformed Products are applied over the conductor they not only safeguard the conductor against wear and stress, but share its load. Specify Fanner Superformed Products for these advantages:
• Every inch is factory tailored to exacting standards that assure total self-adherance to the conductor.
• Short-lay construction, as shown in the cut-away illustration above, binds all conductor wires firmly but gently so that none can become over strained.
• Full length continuous grip — as opposed to isolated clamping — enables conductor and armor rod to work in unison to provide maximum protection against mechanical and electrical overstress at support points.
Provide Superformed Protection at every support point
Armor Rods for heavy duty or longer spans and higher tensions.
Lineguards for lighter duty on shorter spans and lower tensions.
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ARMOR RODS • LINEGUARDS • TAP ARMOR • PATCH RODS • FANNGRIPS • FANNSPLICES
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Stuart Sutcliffe

► **Roy F. Stuart** has been appointed general superintendent of substations for Pacific Gas and Electric Co., to succeed **Harold T. Sutcliffe,** who retired Dec. 31. The position carries responsibility for the operation of more than 800 substations. Stuart joined PG and E in 1925 upon graduation from the University of California, and has been directly associated with substation operations for 12 years. Sutcliffe is a native of Oregon, and earned his degree at Cornell University in 1916. He had one year with PG and E prior to World War I and returned to the company after retirement as a captain.

► **Jerome W. Komes** has been elected senior vice-president of Bechtel Corp., and to the executive vice-presidency and other appropriate positions in the company's international subsidiaries and affiliates. He will have the senior operational responsibilities for the extensive overseas activities of the Bechtel organization.

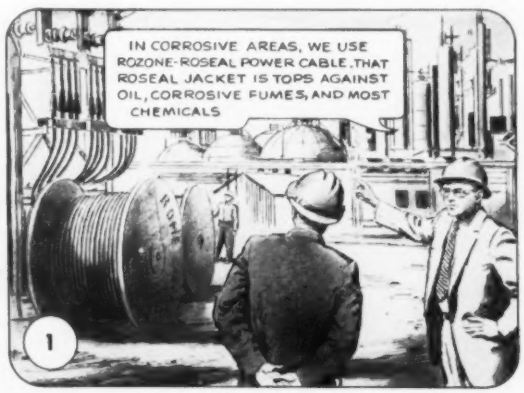
► **Ellison C. Shute** has been appointed manager of the Atomic Energy Commission's San Francisco operations office at Oakland. He succeeds **Dr. Harold A. Fidler,** who is accepting a position as assistant to the director of the Ernest O. Lawrence Radiation Laboratory, University of California, Berkeley.

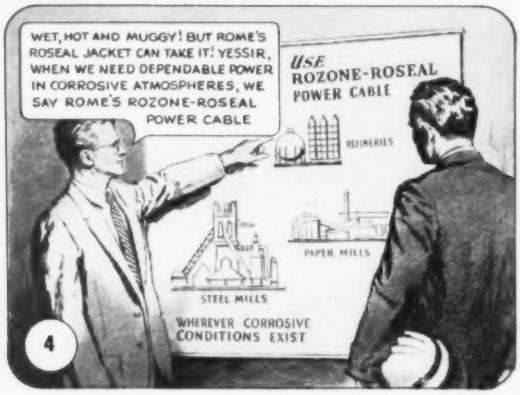
► **Clarence J. Frenck,** electrical engineer, retired from the Portland district, Corps of Engineers, in November. Nine of his 21 years in federal service were with Bonneville Power Administration. He has accepted a position with the United Nations in Ceylon.

Pape Carr

► **W. Frank Pape,** manager of the East Bay division of Pacific Gas and Electric Co., retired Dec. 31. He will be succeeded by **Harold F. Carr,** former manager of the company's personnel department. Both men have spent much of their utility careers in the East Bay division. Carr joined PG and E in 1930 as a member of an electric line crew. For 10 years beginning in 1941 he was executive secretary of Pacific Service Employees Assn. Pape ends 46 years of service with the company. He began full-time employment in 1912.

► **Robert Fewell,** former manager of the Yakima branch of Westinghouse Electric Supply Co., has been promoted to North Pacific district sales manager. Fewell started with the company 20 years ago at Tacoma,


IN CORROSIVE AREAS, WE USE ROZONE-ROSEAL POWER CABLE. THAT ROSEAL JACKET IS TOPS AGAINST OIL, CORROSIVE FUMES, AND MOST CHEMICALS
1


WET, HOT AND MUGGY! BUT ROME'S ROSEAL JACKET CAN TAKE IT! YESSIR, WHEN WE NEED DEPENDABLE POWER IN CORROSIVE ATMOSPHERES, WE SAY ROME'S ROZONE-ROSEAL POWER CABLE
USE ROZONE-ROSEAL POWER CABLE
REFINERIES
PAPER MILLS
STEEL MILLS
WHEREVER CORROSIVE CONDITIONS EXIST
4

and had been in Yakima five years. **Fred Sinnes** has been promoted from sales representative to branch manager at Yakima, after 10 years with the company.

Nelson

Brand

► **George S. Brand** has been appointed electric superintendent for the San Francisco division of Pacific Gas and Electric Co. He succeeds **C. B. Nelson,** who retired Dec. 31 after serving with the company since 1921. Brand, who has been assistant superintendent for three years, joined PG and E in 1924 upon his graduation from University of California. He worked up through the ranks in San Francisco, and in 1952 was sent to Chico for a three-year period as electric superintendent for the De-Sabla division. Nelson is also a U. C. graduate. His entire PG and E career has been in San Francisco.

► **C. D. Smith,** district office supervisor for apparatus sales for Westinghouse in Los Angeles, has been awarded his 40-year emblem.

► **C. W. Goodwin Jr.,** San Francisco district manager for General Electric Supply Co. for the past 23 years, has announced his retirement after 48 years with the company. He has been active in northern California's electrical industry for many years, and for the past two years has been president of the Northern California Electrical Bureau.

► **Delmar St. Laurent** has been named superintendent of the Redlands district of Southern California Edison Co. He succeeds **Jacob Maier Jr.,** who retired Oct. 1. Maier had been with Edison since 1915, and had spent his entire career with the company in the Redlands office.

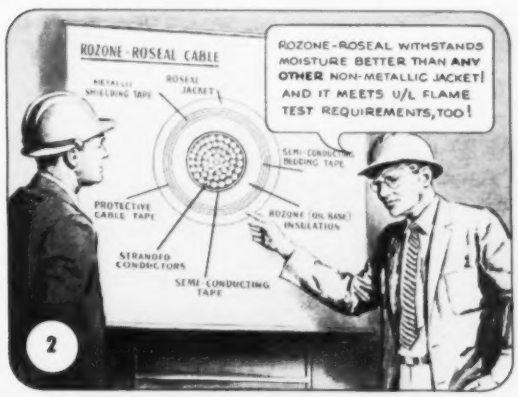
► **J. Robert Wolcott** has been named manager of manufacturing for General Electric's atomic power equipment department. He succeeds **John M. Hobbs,** recently appointed to the G-E manufacturing services organization in New York. Headquartering in San Jose, Wolcott will be responsible for all phases of the APED manufacturing operation.

► **Howard D. Campbell** has joined the Los Angeles sales office of Ilg Electric Ventilating Co. He is a graduate of the University of Southern California, and was formerly associated with Goodyear Tire & Rubber Co. The company manufactures ventilating, heating and air conditioning equipment.

Campbell

► **Fred E. Bohnet** has been promoted to district foreman of Western Colorado Power's North Fork Valley district.

► **W. A. Boyer,** former Butte resident and at one time assistant electrical superintendent for Anaconda Co., has been named manager of the industrial engineering department, a newly created division of the Bunker Hill Co. at Kellogg, Idaho. The new department will make studies in the field of modernization.



Available in voltage ranges through 15 kv Rozone-Roseal preferred power cable may be installed in air, conduit, underground ducts, or directly in earth. Your choice of premium ozone-resistant insulations: Rozone (oil-base) or Rozone A (butyl-base). For complete information, contact your nearest Rome Cable representative and ask for Bulletin RCD-700. Or mail the coupon today.

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A matter of FACT

Photo of conventional rubber specimen after short-time ozone test. Photo of Rozone specimen after long-time ozone test.

Rozone insulation is high in dielectric and impulse strength and has excellent resistance to corona and ozone cutting.

FREE BULLETIN describes the benefits of Rome's preferred high-voltage power cables.

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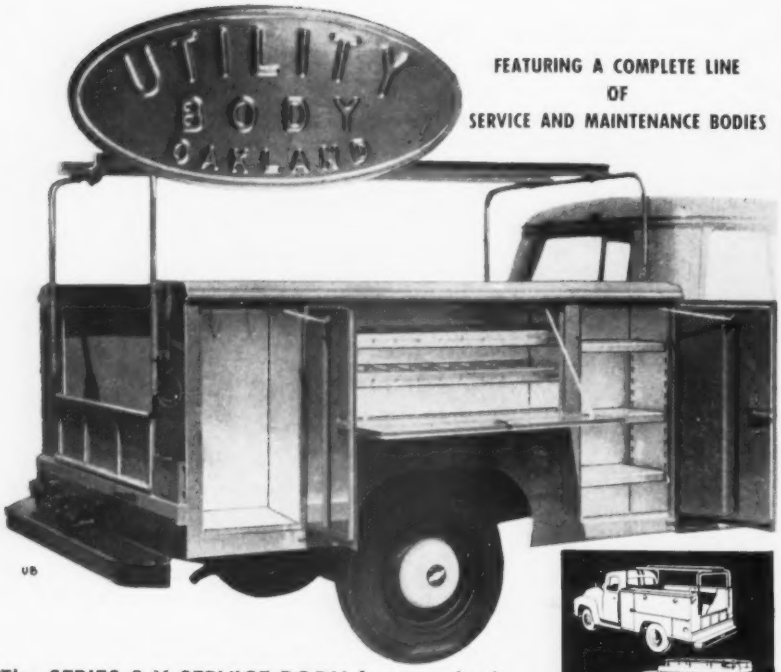

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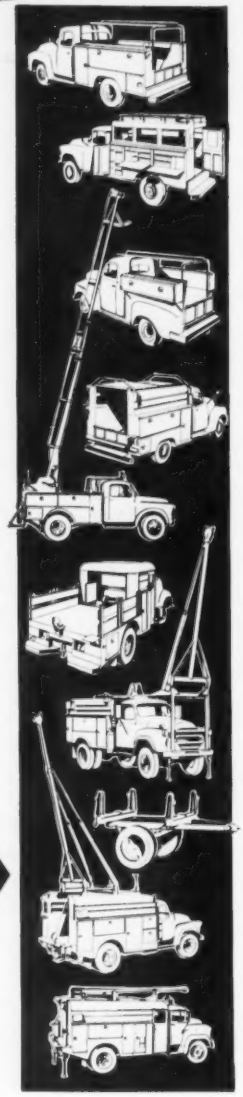
- **Drip mouldings above all doors.**
- **Chains supplied so that horizontal door provides a horizontal work table when open.**
- **Precise workmanship and careful finishing result in equipment on which you are proud to display your name.**

Tell us your problems. Utility Body's Custom Design Service solves them by building to your requirements without additional cost.



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Manufacturers—Distributors

Anders

Buchanan

Management Changes

All-Brite Fluorescent Fixtures, which recently incorporated to succeed Fluorescent Fixtures of California, has announced changes in top management. E. O. Anders has been elected chairman of the board and Vice-president C. D. Buchanan has succeeded him as president.

Anders was the founder of the All-Brite line and was president of Fluorescent Fixtures of California. Buchanan, who has been with the company 10 years, will also serve as general sales manager.

The South San Francisco firm has plants in Los Angeles, Seattle and Vancouver. The Seattle assembly plant has just been opened at 1238 Weller St. to replace a Portland operation. A. G. Miller, who was in charge at Portland, heads the Seattle plant, which will serve both cities.

The firm is planning expansion into eastern, southern and midwest markets and estimates it will have 500,000 sq ft in plant and 1,000 employees within two years.

Firm Expands

A two-year expansion that has doubled factory space and production is reported by Ray Blakeman, president of Blakeman Bros., Los Angeles manufacturer of meter mounting devices since 1935. Blakeman has recently been appointed to distribute Murray Mfg. Co.'s complete line in southern California, which, Blakeman said, will allow his firm to specialize in devices to meet the conditions of the Western states and still have a complete distribution of meter mounting devices.

Blakeman has just completed a 15,000-sq-ft warehouse. Other recent innovations are a new assembly system, an engineering department office, a staff of sales engineers to present the products and help solve problems in the field, a publicity

NEW

JOINS 26% FASTER

Because there are no separate couplings to assemble on the job, Orangeburg's new CA Conduit lays faster—costs less to install. In addition, there are no coupling cartons to handle, transport or store.

Orangeburg's new CA Conduit comes, at *no extra cost*, with a factory-attached coupling at one end and a standard 2° male taper at the other end. To join—CA's long, lightweight lengths are placed end to end—hammered home in a simple, one-step operation. Actual installations *prove* Orangeburg's new CA Conduit joins up to 26% faster!

What's more, because the attached coupling is *flush* with the outside diameter of the conduit, new CA Conduit is easy to handle and store in neat, even stacks. And with the new flush coupling there's no need to "stagger" conduit joints in the trench. That means less cutting and tooling time.

New CA Conduit—like the millions of feet of Orangeburg Fibre Conduit in use since 1893—has self-sealing joints and impermeable walls that make it absolutely watertight. Its smooth 100% fibre raceway adds years to cable life.

Specify new CA Conduit on your next job. This addition to Orangeburg's line is available in 2", 3", 4", 4½" and 5" sizes. Orangeburg's Standard and Nocrete Conduit with separate sleeve couplings are available as always. Orangeburg Manufacturing Co., Orangeburg, N. Y. and Newark, Calif.

ORANGEBURG MANUFACTURING CO.
A Division of The Flintkote Company, Manufacturers of America's Broadest Line of Building Products

Orangeburg Fibre Conduit is distributed by Graybar Electric Co. and General Electric Supply Co. with branches and stocks in principal cities.

For Assured Quality... Choose Red DOT FITTINGS

★ Durability
★ Outstanding Design
★ Roominess for wiring
★ Flat backed for snug fit
★ No interior obstacles
★ Adaptable to every use
★ Smoother finish inside and out

Reasons why the RED ● DOT guarantees better fittings:

THEY'RE RUGGED:

A special alloy is used on these die cast fittings to insure added strength. In our design we have given points of stress extra heavy wall sections so that they will stand up under the toughest conditions.

THEY'RE EASY TO USE:

Light weight aluminum makes them easy to handle; inside roominess and absence of lugs makes wiring and splicing easier. Precision threading for ease of assembly — a special feature found only in the Red ● Dot Line — puts these fittings in a class by themselves.

THEY'RE GOOD-LOOKING:

Engineered design, and a smoother lacquered finish both inside and out combine to make these fittings superior. The flat back feature enables them to hug a wall or ceiling.

They're Die Cast They're Aluminum

RED ● DOT Conduit Fittings are available in this wide assortment:

Series "A" Conduit Bodies
Threaded for heavy wall rigid conduit.

Series "B" Conduit Bodies
Set-Screw for thin wall conduit (EMT) electrical metallic tubing.

Sizes Available—
Series "A" up to 4"
Series "B" up to 2"

Covers available for both series.

Send for New illustrated Catalog of complete RED ● DOT Line.

Sold only through Authorized Electrical Distributors

Our Guarantee
Each RED ● DOT fitting is guaranteed against defects under normal usage by the L. E. Mason Co., New England's leading Precision Die Caster.
Look for the RED ● DOT as your assurance of 100% inspection and guaranteed quality.
L.E. Mason Co

SERVING INDUSTRY Mason FOR 25 YEARS

L. E. Mason Co. BOSTON 36, MASSACHUSETTS

office to handle advertising, catalogs and special promotions.

An agency has been set up at Phoenix with R. L. Mooney as representative. The company is represented in San Francisco by the F. M. Nicholas Co. Plans for 1959 call for offices in Denver, Salt Lake City, Seattle and Portland.

The company was founded by Ray and Carl Blakeman, electrical contractors, who began by manufacturing a few small items for fellow contractors, using the know-how gained in the field to work out their designs.

In announcing continued expansion plans, Blakeman said: "The one-man shop is no longer sensible or even possible. Now all electrical business is big business." As for his company's growth, he said: "If there is one reason for our success, it is because we have taken advantage of suggestions from our customers. We began as electrical contractors and we feel the contractors who are doing the actual work and handling our devices are the best judges of what they need."

New Building for I-T-E

A new district office and warehouse is being built for I-T-E Circuit Breaker Co. in Utah Construction Co.'s South San Francisco Industrial Park. Ground for the 20,000-sq-ft building was broken in mid-December and I-T-E expects to move in about April 1.

The $300,000 facility will be leased to I-T-E by Utah Construction, which has located 28 other firms in the three parks being developed as an industrial area.

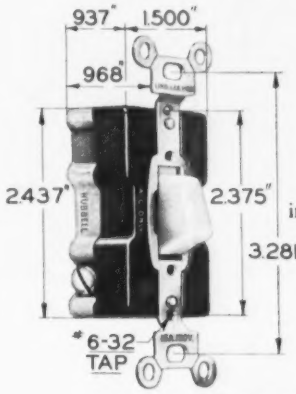
Henry S. Conard, manager for market research and warehouse distribution, handled details for I-T-E. Thomas F. Maley is district manager.

► **Frank B. Murray** has been appointed to the newly created position of Western regional manager for Murray Manufacturing Corp. The company also announced the appointment of three additional manufacturer's representatives in the Western states. They are **Gaer Sales** in Denver for Colorado, Utah, Wyoming, New Mexico and parts of Idaho; **Ralph L. Mooney** in Phoenix for Arizona and part of Nevada; and **Blakeman Bros.** in Los Angeles for southern California. Murray is also represented in the West by **E. F. Hauch Co.**, San Francisco, and by **Northwest Sales Co.**, Portland.

► **Hotpoint**, which gave up its Mart space in San Francisco several months ago, is now in a new West-

Quality... you can put your finger on...

A. C. presSwitch TRADEMARK with lighted button



No stumbling or fumbling in the dark to find this switch. A tiny, subminiature, neon bulb in the button is always "on" when the switch is "off", showing you right where it is, day or night. It's the last word in switch safety, luxury and convenience, . . and it costs only pennies a year to operate.

This lighted button "Presswitch" is the latest in Hubbell's complete line of "Presswitch" units, now available both lighted and unlighted and in 15 and 20 ampere ratings. All "Presswitch" devices fit standard boxes and utilize standard wall plates. No special wiring is involved.

CAT. NO. 1257-I
15 amperes, 120 volts, A.C. Single-pole, with lighted ivorine button and feed-thru terminal

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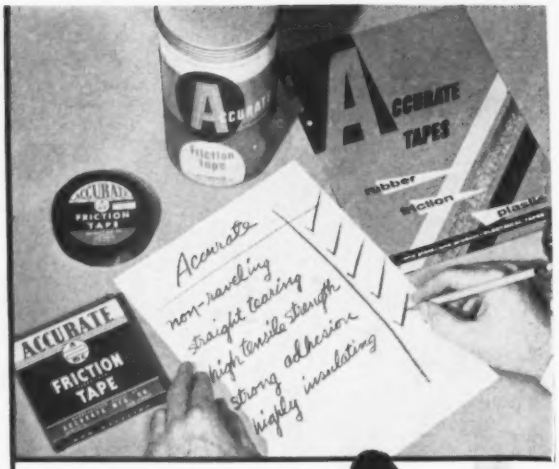

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FRICTION .... RUBBER .... PLASTIC

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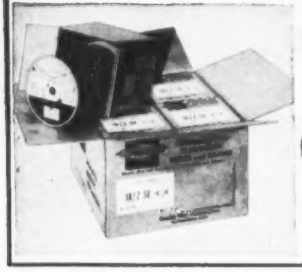

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Associations

IES

"Be Prepared" is not only a Boy Scout slogan but to Beverly Travis, consulting engineer, Seattle, and Pacific Northwest Regional vice-president of the Illuminating Engineering Society, it was a way in which to start the new officers and committeemen of the sections and chapters on the year's work. The idea had been well worth-while for the South Pacific region for two years. So Travis called all hands to a special conference in Spokane at the new Wash-

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ington Water Power Co. headquarters auditorium recently.

A complete review was made of all of the chapter and section functions and responsibilities, from attendance to zones, with an eye to coordination of the entire region's activities. There was representation from every chapter and section in Oregon, Washington, British Columbia and Alberta, a total of 26.

Major topic was the 1959 regional conference plans. Financing the Banff conference this year, May 26-29, will be shared by the various chapters. Banff had been selected instead of Seattle in the vote at last year's conference in Portland. Seattle will have the 1960 conference; Vancouver that in 1961. The suggestion that future conferences be combined with other regions was turned down.

To give daytime freedom to see the scenic splendor around Banff Co-chairman Don Frost said that technical sessions would be held in the evenings. Consideration was also given to chartering a train to aid in the transportation problem to and from Banff. Travel by automobile seemed to be preferred.

Among the big projects for the year announced were: B. C. Section, illumination of Queen Elizabeth Park; Oregon Section, a new chapter at Eugene (a study club has already been formed as a nucleus); Inland Empire Chapter, residential lighting; Edmonton Chapter, student activities at the university; Puget Sound Section, daylight study. Possibility of a chapter in Montana was also discussed. Inclusion of Alaska in the region's boundaries was also advocated.

Attendance at the National Technical Conference in San Francisco, Sept. 7-11, was strongly urged and Jack Cottingham of Portland volunteered to contact Easterners who may attend the San Francisco conference to urge that they route their trip through the Pacific Northwest. A schedule of regular meeting dates for the various chapters and sections was proposed to be set up in such a way that prominent speakers coming West could plan to cover a series of meetings. However this was not worked out completely.

SRVEA

Date for the annual electrical conference of SRVEA has been set at Feb. 14 in Boise. President Paul W. Worthen appointed H. W. Toedtemeier, immediate past president, as its general chairman, who promises a new approach to the conference program.

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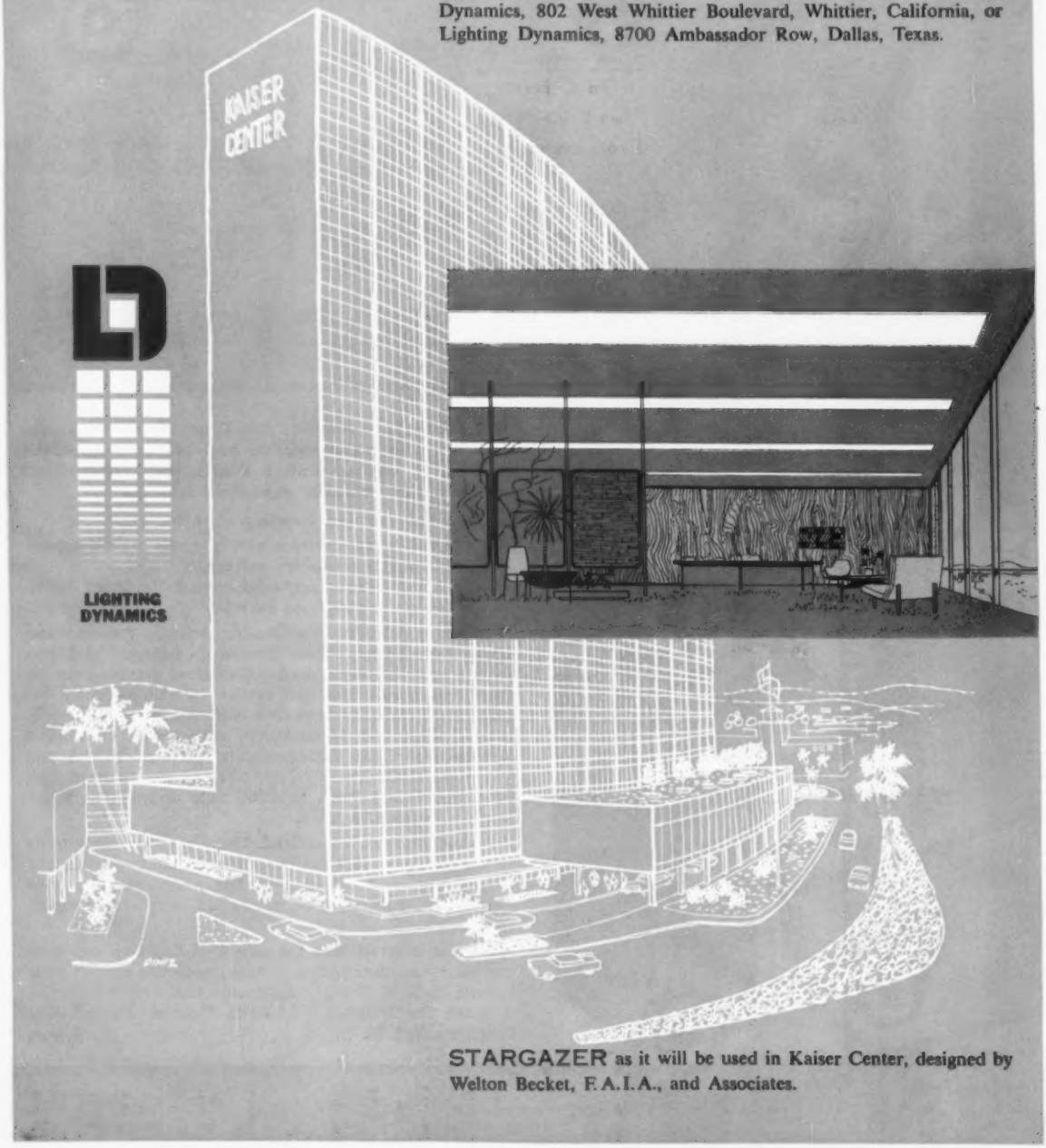

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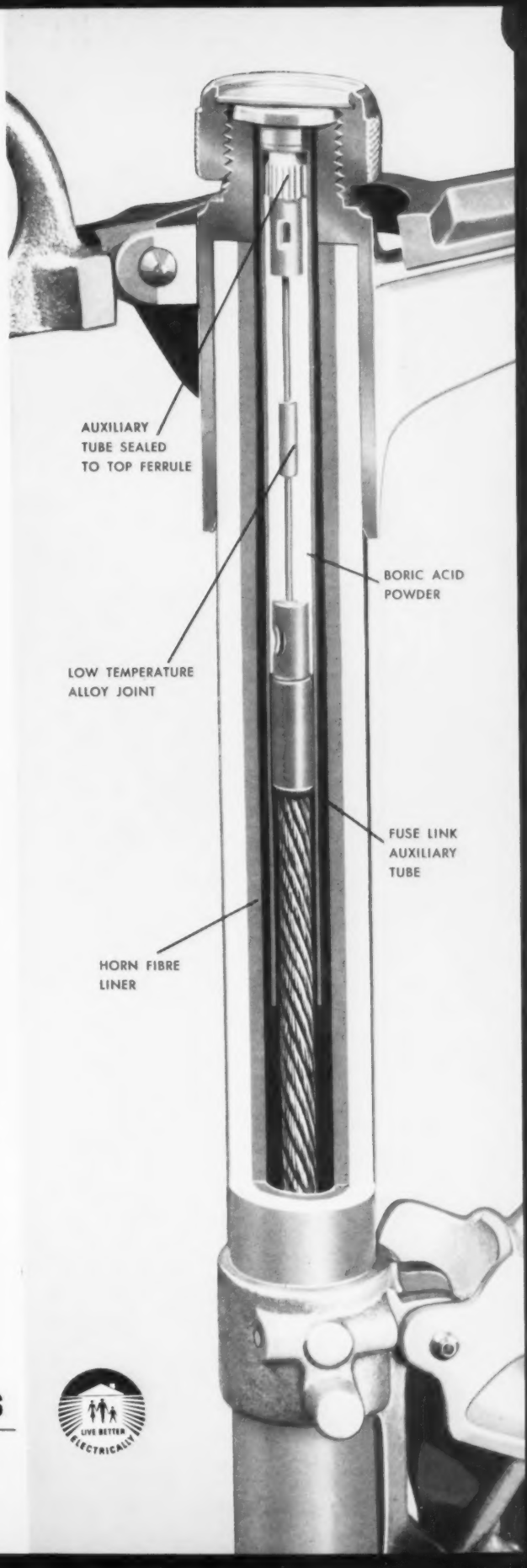
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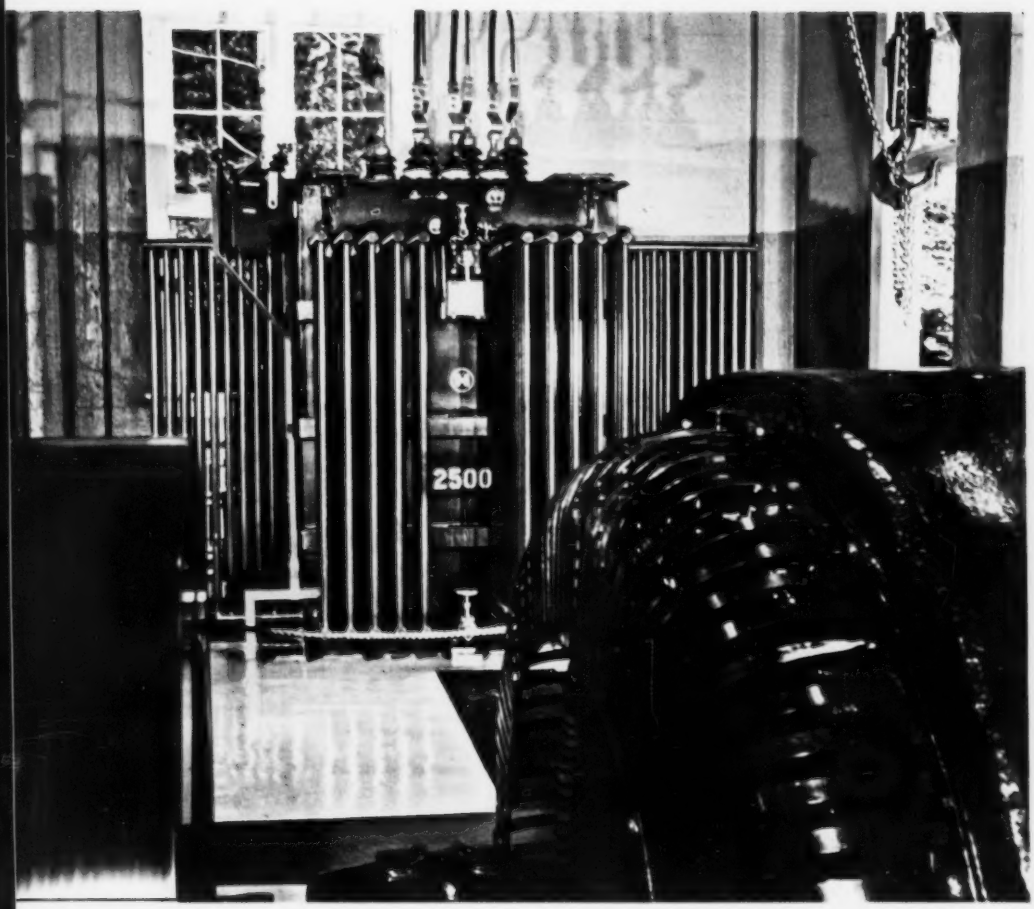

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